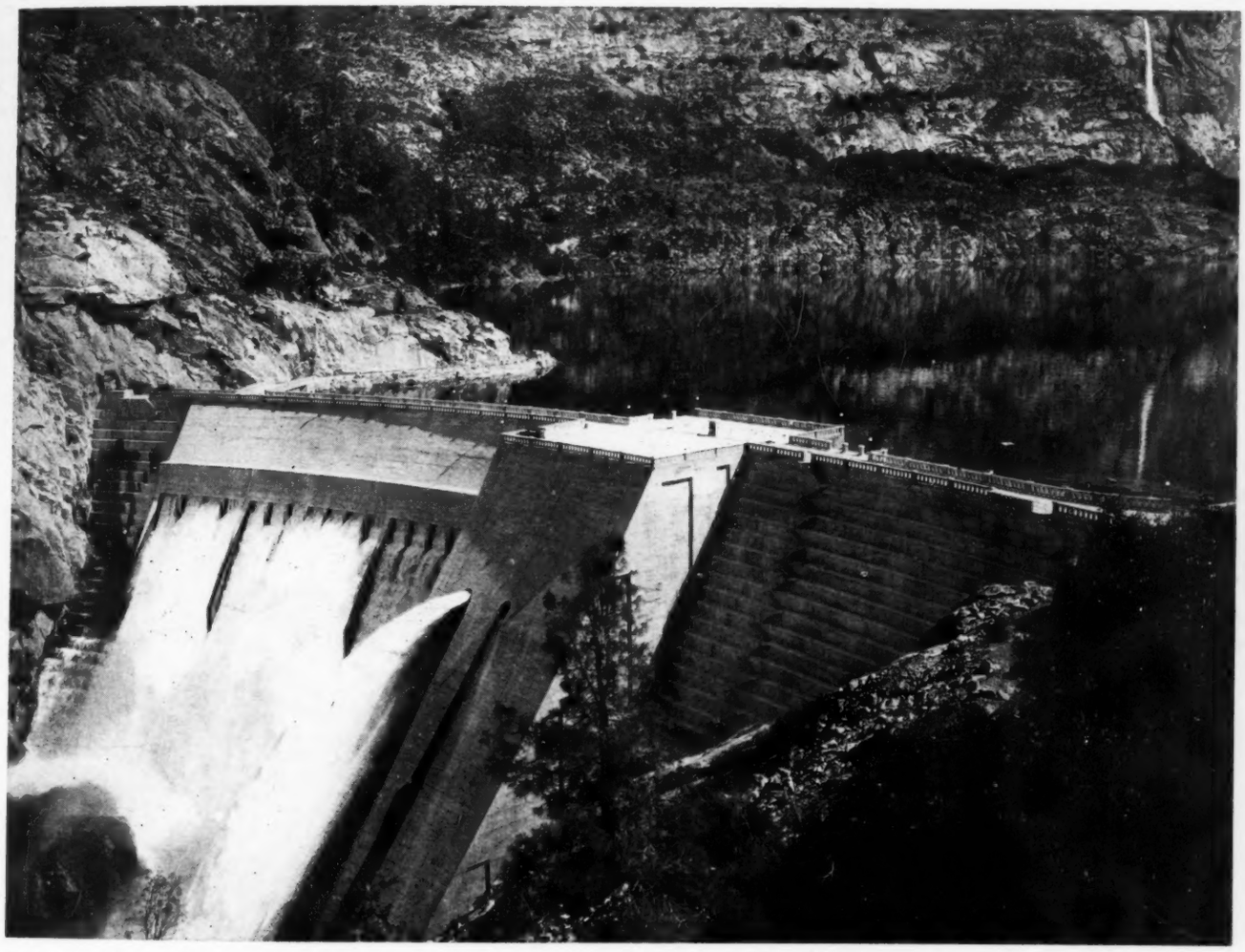
# WATER WORKS AND SEWERAGE

November, 1934 — Editor — Vol. LXXXI. No. 11



*The O'Shaughnessy Dam—San Francisco Gets Its First Drink of Hetch Hetchy Water, Turned Into the Distribution System Oct. 28, 1934*

IN THIS ISSUE

Advertising the Water Utility
Thawing Frozen Service Pipes
A New Development in Sewer Construction
Southwest Water Works Association Holds 23rd Annual Convention
Report of Oneonta Meeting of New York State Sewage Works Association

# *Progress at* Perth Amboy

P. W. A. JOB DOCKET 1748

EVERY week inquiries as to how the new sewage plant at Perth Amboy is progressing, evidence the keen interest of the profession in this modern disposal process. • The photograph above was taken October 20, 1934. In the two large circular tanks will be installed the Laughlin Magnetite Filters. • The outlet weirs may be seen just below the inner rims of the tanks . . . also the building foundations, showing the screen chamber and floccing channels. • The steel for the building is now being erected, and the installation of equipment begins about November 15. • The work has been inspected with great interest by visiting engineers and officials.

### *Modern Chemical-Mechanical Treatment*

This plant will have a capacity of 10 m.g.d. average—20 m.g.d. maximum. It is designed to effect complete disposal of sewage by furnishing a clear, sparkling effluent, sterilized with chlorine . . . and destruction of sludge by incineration. • You may recall that Perth Amboy's disposal problem involves sewage from a population of 50,000 . . . and industrial wastes from ten sizeable plants.

• Consulting Engineer: Louis P. Booz, Perth Amboy, New Jersey.

*Our new two-color 9" x 12" booklet: FILTRATION and FILTERS tells about and pictures our various types of filters and dewaterers employed in sewage treatment and water supply purification.*

*This booklet is planned to fit your file. It belongs in the reference library of every sewage and water works official and consulting engineer. It will be a pleasure to send you a copy . . . without obligation, of course.*

## FILTRATION EQUIPMENT CORPORATION

*Division of* AMERICAN CYANAMID COMPANY

Sales Office: 350 Madison Avenue New York

# WATER WORKS & SEWERAGE

L. H. ENSLOW,
Editor

## LEADING ARTICLES To Appear in the Next and Subsequent Issues

John A. Carollo, Phoenix, Arizona, will describe a simplified method of determining "Deterioration and Loss of Carrying Capacity of Water Mains" without interruption of service or costly preparation. L. R. Burch, Tucson, Arizona, in a companion article, tells of the method used by the Tucson Water Department, and with what results.

R. D. Scott, Chief Chemist, Division Laboratories, Ohio State Department of Health, in a timely and important article on "Testing for Residual Chlorine" sets forth an improved technic which lessens markedly or eliminates errors due to manganese, nitrites and other interfering substances. The contribution possesses particular value for those responsible for chlorination control.

C. E. Keefer, Engineer of Sewage Treatment, Baltimore, Md., will discuss sludge dewatering operations at Baltimore. Ordinary sand bed operation, vs. vacuum filtration, vs. the elutriation-filtration process, recently developed at Baltimore, will be compared and cost data presented.

John H. Murdoch, Jr., Uniontown Water Company, Washington, Pa., who is Chairman Finance Division A.W.W.A., will discuss "Present Trends in Public Utility Rate Making and Financing."

C. H. Young, District Engineer, Penna. State Department of Health, will discuss the operation of the Meadville, Pa., Sewage Treatment Plant,—presenting results and conclusions drawn from operating experiences during the past 18 months.

W. M. Rapp, Supt. of Construction and Distribution, Water Department, Atlanta, Ga., will describe a novel scheme, and the equipment devised for securing cool drinking water by putting to use the natural earth cooling which results in the coolness of well waters.

T. M. Riddick, Sanitary Engineering Laboratories, New York University, will continue the description of home-made laboratory equipment.

S. R. Spencer, Chairman, Board of Water Commissioners, Waco, Texas, will discuss "The Commission Form of Water Department Control and How it Works at Waco, Texas," where it was adopted in 1904, and has worked so satisfactorily since.

M. W. Tatlock, Supt. of Sewage Treatment, Dayton, Ohio, will describe recent improvements in fertilizer production facilities at the Dayton plant and relate the successful marketing of pulverized digested sludge at a worthwhile profit.

H. K. Palmer, Los Angeles County Sanitation District, will describe a simplified but effective scheme and equipment developed to eliminate check valve slam and surging when water or sewage pumps kick out of service.

Albert A. Ross, Supt. of Water Works & Sewerage, Lexington, Mass., will give the reader the benefit of experiences gained in "Water Main and Service Thawing" during the past winter at Lexington.

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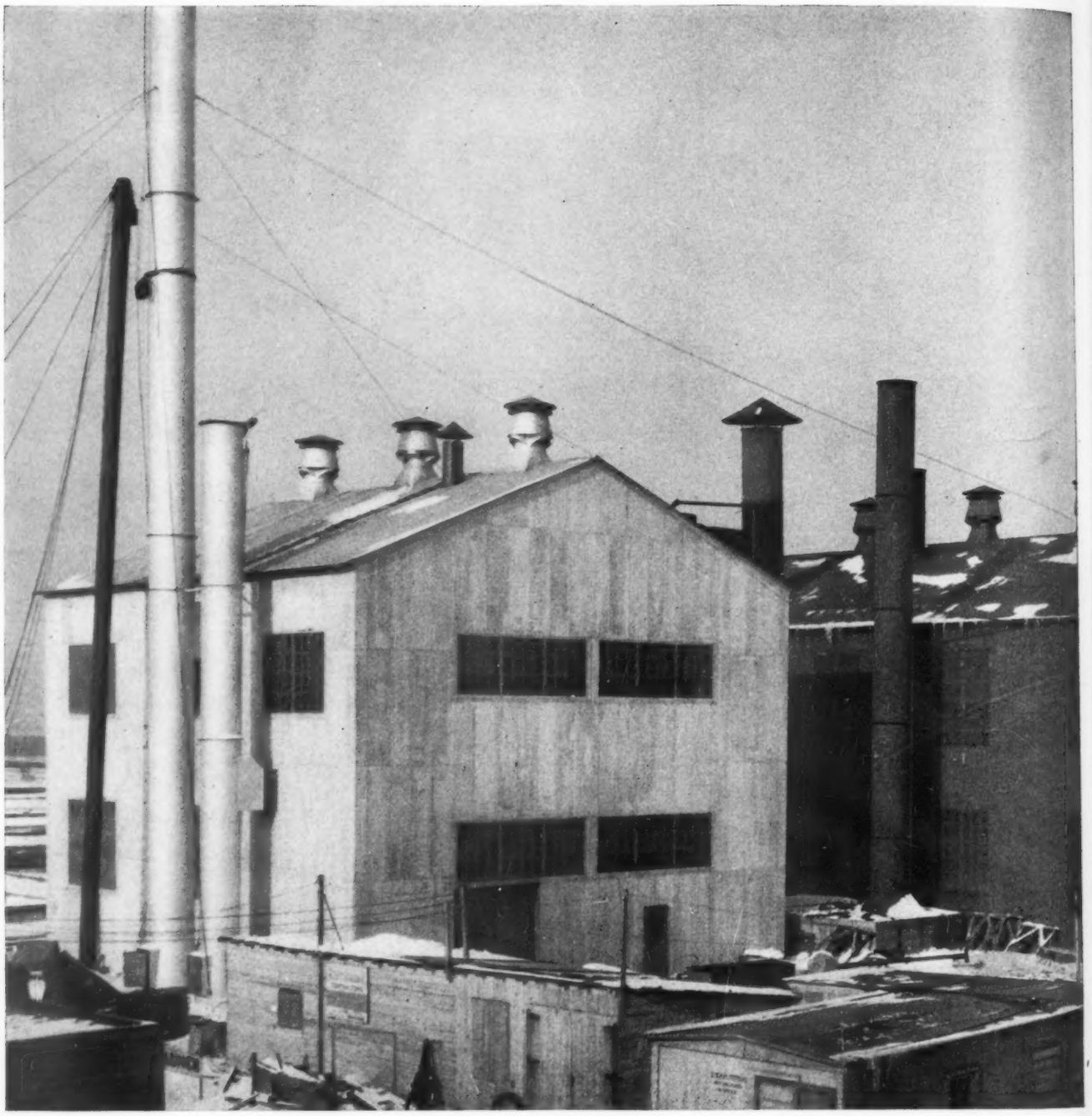
# Announcing..



**Sewage Sludge Incineration Plant at the West Side Sewage Treatment Works of the Sanitary District of Chicago**

# COMBUSTION

# . . a Guaranteed Odorless and Efficient Method of Sewage Sludge Drying and Incineration . . .

*Sludge dried and pulverized in Raymond Kiln Mills.*

*Dried sludge burned in suspension.*

*Ljungstrom Air Preheaters provide heat for drying.*

*Completely closed system. Odorless. All gases and vapors from drying operation pass through high temperature combustion chamber.*

*High thermal efficiency. Minimum fuel requirement.*

*Low cost factor.*

*Adaptable to any type of sludge and screenings.*

*Easily operated and maintained.*

*Designed based on well developed drying, combustion and heat transfer equipment, used successfully for many years in other fields.*

*Correctness of application for sewage established in a commercial unit of 20 tons (dry basis) capacity in operation for several months at the West Side Sewage Treatment Works of the Sanitary District of Chicago.*

*A complete plant with one responsibility and overall guarantees.*

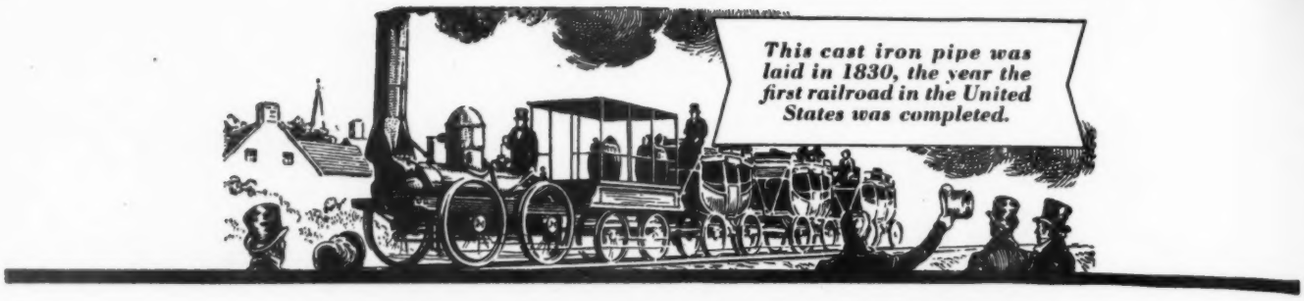
**BULLETIN NOW READY . . . *WRITE FOR COPY***

**COMBUSTION ENGINEERING COMPANY, INC.**

220 MADISON AVENUE, NEW YORK • OFFICES IN PRINCIPAL CITIES

# ENGINEERING

Please mention WATER WORKS AND SEWERAGE—it helps.



# 104 Years Old
## *and good for many more*

**AT an official inspection of the century-old cast iron water main shown above, former Mayor Mackey of Philadelphia said: "Notwithstanding the great changes that have taken place in our city, this cast iron pipe stands perfect in all its integrity as disclosed to us tonight after having made the excavation and taken out a section." Now 104 years old this main is good for many more years of service. A few squares away lies the oldest cast iron water main in the country, laid in 1822, functioning satisfactorily after 112 years of service.**

**Cast iron mains still in use after serving 100 to 200 years, and longer, were recently uncovered and inspected in England, France, Germany and the United States. All were in satisfactory condition for further service. Thus, evidence accumulates to prove that the useful life of cast iron pipe is *more than a century.***

**The reason for the long life and low maintenance cost of cast iron pipe is its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it.**

**For further information, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Bldg., Chicago, Ill.**

***Methods of evaluating bids now in use by engineers rate the life of cast iron pipe at 100 years minimum***

# CAST IRON PIPE

*Look for this* *trade-mark*



Yes—we would like you to mention WATER WORKS AND SEWERAGE.

Taste and Odor Control
Published monthly by the
Industrial Chemical Sales Co., Inc., New York
VOL. 1
OCTOBER, 1934
No. 2
This little Journal is dedicated to the advancement of better public water supplies, especially as regards elimination of tastes and odors, thereby strengthening the public relations between Producer and Consumer. It is our intention to present early and authoritative information covering all forms of taste and odor control, direct from outstanding water works executives, chemists and operators. Your contributions will be greatly appreciated.
John P. Harris of Chicago shaking hands with Fred A. Roemelin, Superintendent of Waterworks of Hillsboro, Ill., where the spring meeting of the Illinois Operators' Conference was held. Mr. Roemelin, one of the outstanding operators in Southern Illinois, related his experience with Nuchar in verse at the Hillsboro meeting, to the great delight of all present. He repeated it by special request at the fall conference held at Springfield, September 25th.

# Did You Get Them?

IN September, we mailed the first issue of Taste and Odor Control, and succeeding issues will follow monthly.

This Journal is intended to furnish you practical working plans and suggestions for various types of Taste and Odor control. We want it to be up to the minute, which means we must depend upon your assistance to give us news of this nature to the Water Works fraternity.

If you have had an interesting experience with Taste and Odors, write it up and send it to us. It doesn't have to be about NUCHAR. We only hope NUCHAR has a place in your routine practice of water purification, because it will give you

| | |
|---|---|
| Palatable drinking water | More flexible coagulation. |
| Stabilization of sludge. | Less dead end trouble. |
| Efficient dechlorination. | Chlorine demand control. |
| Filter sand conditioning. | Fewer basin cleanings. |

Incidental benefits and economies.

If you are not on our list, and desire the paper monthly, we will appreciate your advising us, as we do not want to slight anyone. No charge of course.

Sign the coupon today and return it to us at once.

INDUSTRIAL CHEMICAL SALES CO., INC.

230 Park Avenue . . . New York
205 W. Wacker Drive . . . Chicago

Yes, we want to receive the Taste and Odor Control Journal. Please put me on the mailing list.

*NAME* .....

*FIRM* .....

*TITLE* .....

*ADDRESS* .....

WW&S-11-34

## INDUSTRIAL CHEMICAL SALES COMPANY, INC.

230 Park Avenue, New York — 205 West Wacker Drive, Chicago, Ill.

# New! And ONLY $595

## A complete Portable Electric-Power Plant that literally pours electric heat into frozen Mains and Services.

A portable electric pipe thawing Generator coupled to an Air Cooled Gasoline Motor! Both Generator and Motor have tremendous capacity for all thawing jobs.

The Darley Generator is built to meet exacting requirements—CONCENTRATED HEAT, LOW VOLTAGE, SLOW SPEEDS, FLEXIBILITY, ECONOMY and SAFETY in pipe thawing.

No expert electrician or any outside help is needed—And, to connect the cables, start the motor, and pump HEAT into a frozen pipe is only a matter of a few minutes.

Engine and Generator are practically a single unit, mounted on a light four-wheel truck. Weights have been reduced so that it can be lifted on and out of light auto trucks and at the job pulled or rolled along streets, sidewalks, backyards, or even through doorways into buildings, factories, etc.

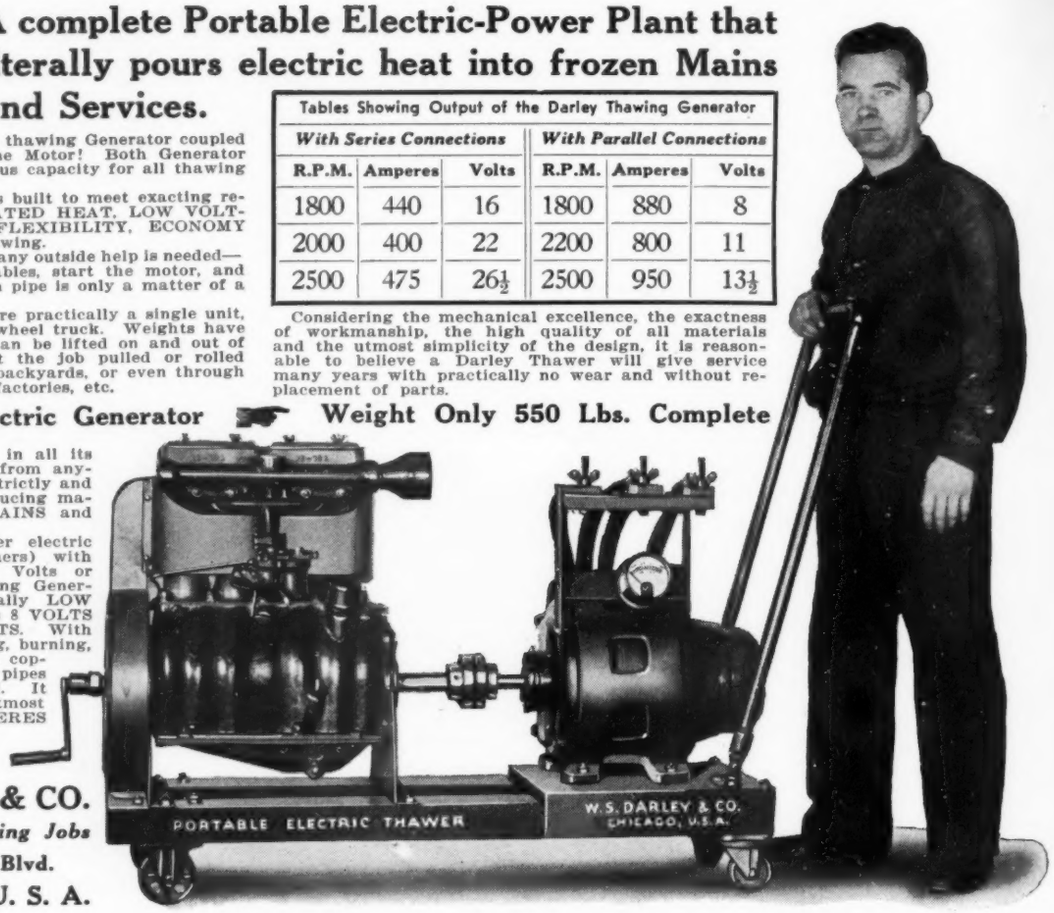
| Tables Showing Output of the Darley Thawing Generator | | | | | |
|---|---|---|---|---|---|
| *With Series Connections* | | | *With Parallel Connections* | | |
| R.P.M. | Amperes | Volts | R.P.M. | Amperes | Volts |
| 1800 | 440 | 16 | 1800 | 880 | 8 |
| 2000 | 400 | 22 | 2200 | 800 | 11 |
| 2500 | 475 | 26½ | 2500 | 950 | 13½ |

Considering the mechanical excellence, the exactness of workmanship, the high quality of all materials and the utmost simplicity of the design, it is reasonable to believe a Darley Thawer will give service many years with practically no wear and without replacement of parts.

**A Distinctive Electric Generator** ☛ **Weight Only 550 Lbs. Complete**

It is entirely different in all its electrical characteristics from anything we know of. It is strictly and exclusively a HEAT producing machine for THAWING MAINS and SERVICES.

In contrast with other electric generators (or transformers) with operating output of 50 Volts or more, the Darley Thawing Generator produces exceptionally LOW VOLTAGE ☛ as low as 8 VOLTS and not over 26½ VOLTS. With this low voltage all arcing, burning, or other damage to lead, copper, steel or iron service pipes and joints is eliminated. It can even be used at its utmost capacity of 950 AMPERES with a maximum of only 13½ VOLTS.




**W. S. DARLEY & CO.**
*Everything for Thawing Jobs*
2810 Washington Blvd.
**CHICAGO — U. S. A.**

LFC

# "Lynchburg" High Tensile
## *Replaces Wooden Staves*

**Lynchburg, Va., now has a right to be proud of its pure, mountain water supply—Nine and one-half miles more of its old wooden stave pipe line is being replaced with "Lynchburg" 36-inch High Tensile Cast Iron Pipe—and every piece delivered on time. —For quick estimates on Cast Iron Pipe and Special Fittings, write, wire or phone "Lynchburg."**

Bell and Spigot Pipe and Fittings. From 4" to 54".
Cast Iron Flanged Pipe. From 3" to 84".
Cast Iron Flanged Fittings and Flanges. From 1" to 84".
Super-de Lavaud Centrifugal Cast Iron Pipe.

Special Iron Castings for the Chemical Industry

## LYNCHBURG FOUNDRY COMPANY

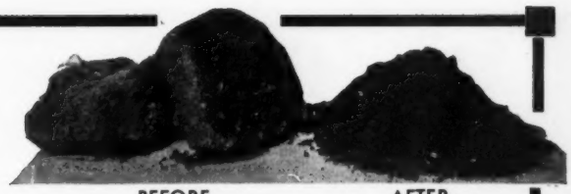
Peoples Gas Building
Chicago, Ill.

GENERAL OFFICE - LYNCHBURG, VIRGINIA

Empire State Building
New York, N. Y.

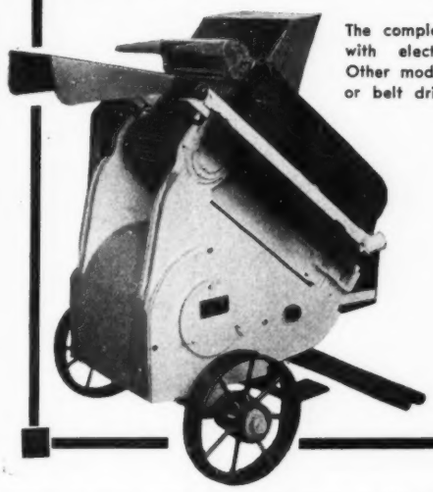
Yes—we would like you to mention WATER WORKS AND SEWERAGE.

# Make a PROFIT on your SLUDGE *with the* ROYER DISINTEGRATOR



BEFORE AFTER

Showing the large damp sludge cakes reduced in one operation to a fine soil conditioner and salable product, for use on lawns and gardens.



The complete machine with electric motor. Other models gasoline or belt drive.

THINK of it! You can shred, or granulate, four cu. yards of sludge cake per hour at a cost of less than 30 cents per yard for labor and power—without any additional cost for pre-drying as the Royer Disintegrator will handle damp sludge, up to 60% moisture, without clogging—and without extra handling as the machine will load the sludge directly to your truck or bins. Where chemicals are to be added the disintegrator will also mix the ingredients.

This one, inexpensive, portable machine can make your sludge output a profitable source of revenue, create a new industry and give profitable employment to several men.

Let us send you details of the machine and some interesting information on the Value of Sewage Sludge as a Fertilizer.

**ROYER FOUNDRY & MACH. CO.**
158 PRINGLE ST. KINGSTON, PA.

C. G. WIGLEY, Sole Rep.
3108 Atlantic Avenue Atlantic City, N. J.

# Ferric Chloride Solution

The feeding of Ferric Chloride Solution, or any other solution, can be accomplished without difficulty by using a

## PHIPPS & BIRD SOLUTION FEEDER

Write for complete details.

**PHIPPS & BIRD, Inc.**
915 EAST CARY STREET
RICHMOND, VIRGINIA

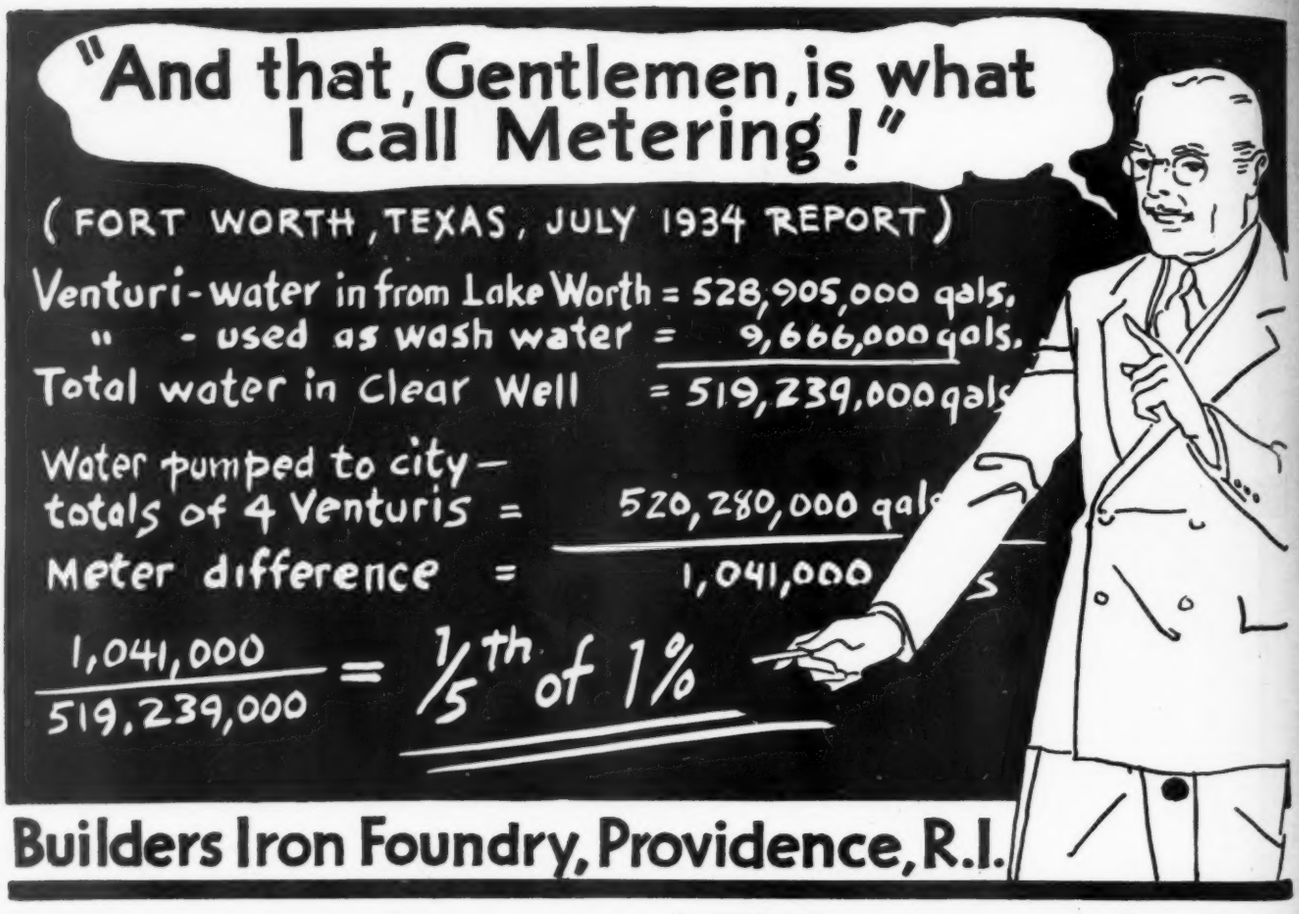
**Pittsburgh Fence**

**A Watchman that can't be kidnapped**

• • •

Mischief makers can't hold up and bind and gag a fence. It's on the job day in and day out, a sturdy and faithful guard, without human frailties and shortcomings. Pittsburgh Chain-Link Fence is made to give many years of trouble-free service. A "Pittsburgh" representative will be glad to estimate the cost of fencing your property without any obligation on your part.

**PITTSBURGH STEEL COMPANY**
*754 Union Trust Bldg., Pittsburgh, Pa.*


"And that, Gentlemen, is what I call Metering!"
(FORT WORTH, TEXAS, JULY 1934 REPORT)
Venturi-water in from Lake Worth = 528,905,000 gals.
" - used as wash water = 9,666,000 gals.
Total water in Clear Well = 519,239,000 gals
Water pumped to city—
totals of 4 Venturis = 520,280,000 gals
Meter difference = 1,041,000
1,041,000 / 519,239,000 = 1/5th of 1%

**Builders Iron Foundry, Providence, R.I.**

# "ISCO" Ferric Chloride

**In the Filter Plant** it is an effective and economical coagulant.

**Ferric Chloride** works fast—requires less mixing and settling time.

**In the Sewage Plant** it is an aid to rapid sludge drying. Applied to crude sewage it will increase settling tank efficiencies and reduce loadings on sprinkling filters and other secondary units.

**Ferric Chloride** treatment following sprinkling filters will produce a sparkling final effluent from humus tanks.

# "ISCO" CHLORINATED LIME

For sterilization of water supplies or swimming pools, and for chlorination at sewage plants, provides a safe, convenient treatment with less total chlorine required.

# "ISCO" SERVICE

We have a sanitary chemical engineering staff, experienced through wide contacts and successful installations. May they contribute their experience and information to your problem?

DISTRIBUTORS OF "CLIFF-CHAR" ACTIVATED CARBON

*Write for full particulars*

**INNIS, SPEIDEN & CO.**
INCORPORATED
117 LIBERTY STREET, NEW YORK.
Established 1816

# HYDRO-TITE *Saves!*

## In First Cost

One pound of Hydro-Tite will take the place of four pounds of lead in a B. & S. cast iron pipe joint. Not only a saving in first cost but storage, shipping and haulage to the job is cut to one-fourth.

## In Installation

All caulking charges are saved—Hydro-Tite does not shrink—it does not need caulking. Your crew can lay more lengths of pipe per day.

## In Permanence

Hydro-Tite makes strong, flexible joints . . . a perfect seal that insures against leakage even under severe service conditions of pipe vibration or shifting.

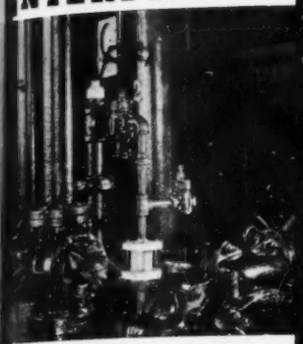
*"In service more than 22 years without a failure anywhere"*

Send for Hydro-Tite Data Book

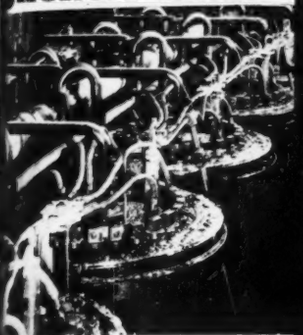
HYDRAULIC DEVELOPMENT CORP.
MAIN SALES OFFICE
52 CHURCH ST., NEW YORK, N. Y.
*General Offices and Works*
West Medford Sta., Boston, Mass.

1934

NTERPRISE



ACKGROUND



ROWTH

In the ancient city of Damascus, the art of making perfectly tempered steel was developed to such a high degree of proficiency that the name of the city became synonymous with "fine steel".

Damascus is remembered as a city that did one thing so well that it commanded the respect of the entire world. In a modern industry—the making of Liquid Chlorine—a similar name and reputation is being built. Today the name EBG is synonymous with purity and uniformity in Liquid Chlorine. It illustrates again the old principle of "doing one thing well".

There are three good reasons for the reputation of EBG. Enterprise: the first in the country. Background: the oldest in the country. Growth: more users than ever before. Three logical reasons why you should always "look for the red cylinder".

EBG Liquid Chlorine

FIRST IN THE COUNTRY

**ELECTRO BLEACHING GAS COMPANY**

Main Office: 9 East 41st Street, New York, N. Y.

Plant: Niagara Falls, N. Y.

# "Better satisfied with this pipe than any we have ever bought"*

**Less than two years ago the first length of Super-de Lavaud Pipe was "cast without chill in a metal mold." Since then we have made and sold *more than seven million feet.* Users like this pipe to the point of enthusiasm, as evidenced by comments such as the one quoted in the headline of this advertisement. They find it tougher, stronger, more ductile, and that, with ordinary care, breakage is almost unknown. Doubled impact-strength gives this pipe powerful inherent protection against damage from shocks encountered in transportation, handling and laying. These advantages are made possible by the patented Super-de Lavaud process in which the pipe is *cast without chill in a metal mold.* For further information, write for booklet.**

UNITED STATES PIPE AND FOUNDRY CO.
BURLINGTON, N. J.

Foundries and Sales Offices throughout the United States

*From statement of user in our files.

## U.S. SUPER-DE LAVAUD PIPE

IMPACT RESISTANCE INCREASED MORE THAN 100%

WATER WORKS AND SEWERAGE
A GILLETTE PUBLICATION
VOL. LXXXI NOVEMBER, 1934 NO. 11

*Office Building, Riverton Consolidated Water Co., Lemoyne, Pa.*

# ADVERTISING THE WATER UTILITY

By W. L. EISERT*

*The Author*

THE most desirable and effective advertising, in the final analysis, is the type that creates an open minded acceptance of the institution itself; specific offerings, important though they may be at the time, are then only incidental to the prestige enjoyed by the institution itself. Because of the nature of service, water companies must direct their efforts to what is known as "Institutional Advertising"—i.e.—promoting favorable acceptance of the company and a realization of its place in the community. By the same token, the very fact that the company dispenses one of the basic essentials and controls the monopoly, imposes an obligation which should influence and modify any public statement, whether it be in the form of paid advertising or the outgrowth of any of the many public relationships that every company, which is to become a large factor in community life, must maintain.

Advertising is not confined to the printed word, which at best can only be one phase and in many respects the smallest part of public contact. In the fuller sense advertisements are composed of all public contacts as created by a personnel that knows its job and does it efficiently and courteously. Both efficiency and courtesy are essential to a complete acceptance of the company. Plant appearance and maintenance are important elements because all property, from the most outlying hydrant to the source of supply, should reflect a high standard of efficiency and general good-housekeeping. And,

*Divisional Chief Engineer, Northeastern Water and Electric Service Corp., Lemoyne, Pa.

**This article is based on a talk made by the author before one of the executive meetings of the Northeastern Water and Electric Service Corporation.**

**Mr. Eisert herein discusses the increasing importance of satisfactory public relations to the water utility and the thought that should be given to the little things that collectively make big impressions leading to "good will"—or bad.**

**The author, formerly in sales promotion work, then a successful Manager of privately owned water companies and now Chief Engineer of a Division of Northeastern's properties, presents this important subject from the viewpoint of one connected with a privately owned and operated water utility.**

**His arguments and suggestions will prove stimulating to every employee of municipally operated systems who may have a genuine interest in making the Water Department the No. 1 utility in his community.—Editor.**

thirdly, publicity through purchased space, news column stories, bulletins, demonstrations, etc., should follow.

Let us regard space advertising as any effective method of acquainting everybody in the territory you serve, with the real facts about your company. Don't regard an advertising campaign as a mere application of white wash. Don't attempt to gloss over the truth. Any attempt at this sort of thing will prove a boomerang, you'll get your publicity but not the kind you expected.

The object of each advertisement should be to put across an idea to the consumer, to let him see your side of a particular question. If you could, it would be far easier to invite him into the office and discuss the matter face to face; but, since this is not practicable, an advertisement is the next best thing. Probably the most effective and vivid moments of the movie that you saw the other evening were the close-ups. The action stopped and your entire attention was focused on one person's face registering one particular emotion. There being nothing else to distract attention all of your senses were drawn to just one idea. Do the same thing in your "Ads," make them "close-ups" and present one—and only one—idea at a time.

Next, what sort of a man is your average consumer; what sort of language does he understand? Think as if you were talking to him face to face and how you would express yourself—then, do the same thing when preparing your ad copy. Use the words of every day conversation and avoid what may appear to your average consumer to be "high hat" literary style.

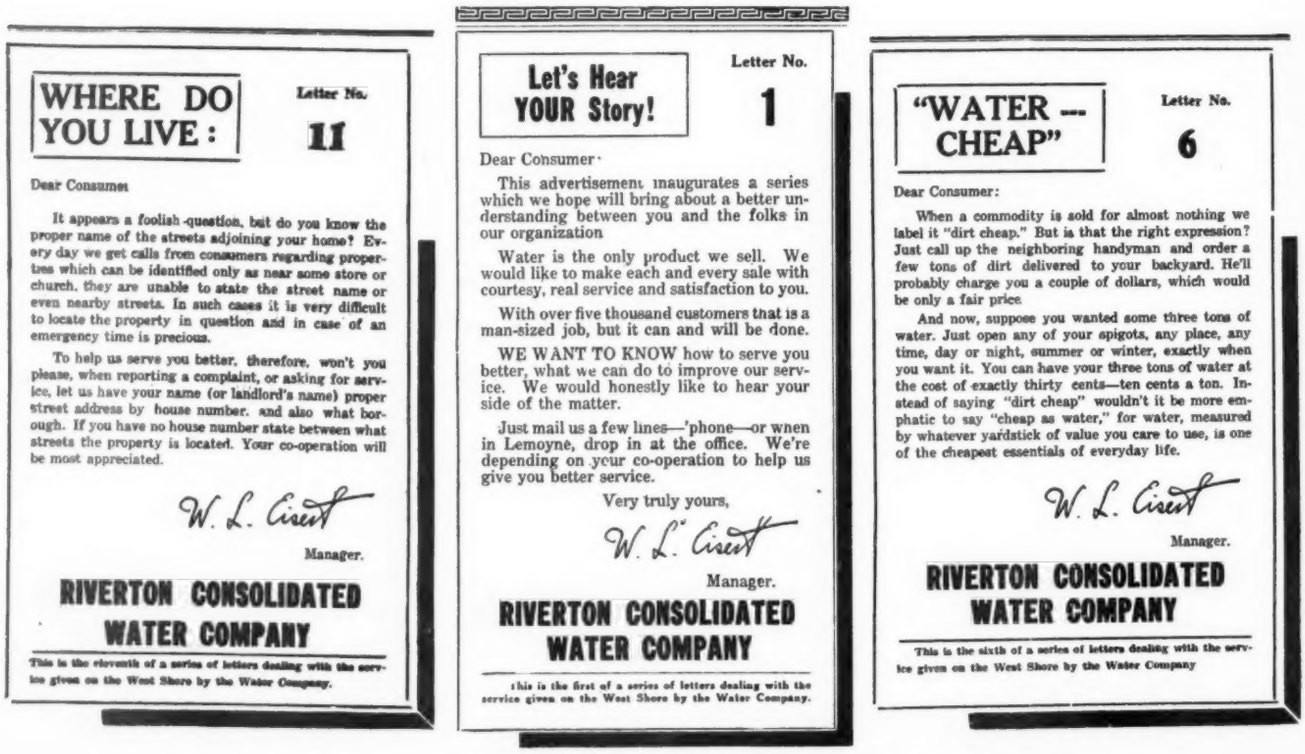
The next consideration is: How much space to use? Here the amount of money available, the number of times the publication appears and the length of your campaign will be the determining factors. Remember, however, that too small an ad will be lost in the shuffle and that if funds are limited, it is better to advertise less frequently and use a more attention-commanding space for each appearance. For the average message, we believe a space two columns wide and four or five inches long is well proportioned, not too expensive, and yet sufficiently large to possess attention value.

With the subject-topic and space decided upon, the next consideration is arrangement. People read headlines and which depends therefore on this part of the ad. So, your next job is to create a headline composed of a short, snappy phrase or punch-line that will grab attention, arouse curiosity, impel the reader to wish to find out what follows in the paragraph below. One more thing remains, you should make your message personal. You are still talking face to face with your average consumer and it is strengthening to have the message signed by you as the local manager.

Our experimental groups of advertisements were presented in the form of a series of letters, the subjects touched upon being pertinent and to the point with titles such as "Self-Service," "Little Drops of Water," "Fire! Fire!" "Estimated Bills," "Don't Forget the Bill Stub," etc., all were written in conversational style and in almost the tabloid newspaper fashion.

## Topics to Use

In your advertisements be human, personalize the company, mention your employees, tell about the trouble caused by bad breaks on stormy nights and the efforts that are taken to maintain service. We are all familiar with the telephone lineman making repairs while the blizzard rages, or the telephone girl who sticks to her post until the insulation begins to fry on the switchboard. Put the water repair crew in the same class, make your readers feel the importance of the fire hydrant down on the corner to himself individually, to his family, to his business. Let them realize that even in times of drought you are maintaining a constant supply of dependable water and incidentally step by step let your readers become familiar with all the stages through which the water travels on its road from the source of supply until



**WHERE DO YOU LIVE:** Letter No. 11

Dear Consumer

It appears a foolish question, but do you know the proper name of the streets adjoining your home? Every day we get calls from consumers regarding properties which can be identified only as near some store or church, they are unable to state the street name or even nearby streets. In such cases it is very difficult to locate the property in question and in case of an emergency time is precious.

To help us serve you better, therefore, won't you please, when reporting a complaint, or asking for service, let us have your name (or landlord's name) proper street address by house number, and also what borough. If you have no house number state between what streets the property is located. Your co-operation will be most appreciated.

W. L. Ciscet

Manager.

**RIVERTON CONSOLIDATED WATER COMPANY**

This is the eleventh of a series of letters dealing with the service given on the West Shore by the Water Company.

**Let's Hear YOUR Story!** Letter No. 1

Dear Consumer:

This advertisement inaugurates a series which we hope will bring about a better understanding between you and the folks in our organization

Water is the only product we sell. We would like to make each and every sale with courtesy, real service and satisfaction to you.

With over five thousand customers that is a man-sized job, but it can and will be done.

WE WANT TO KNOW how to serve you better, what we can do to improve our service. We would honestly like to hear your side of the matter.

Just mail us a few lines—'phone—or when in Lemoyne, drop in at the office. We're depending on your co-operation to help us give you better service.

Very truly yours,

W. L. Ciscet

Manager.

**RIVERTON CONSOLIDATED WATER COMPANY**

This is the first of a series of letters dealing with the service given on the West Shore by the Water Company.

**"WATER — CHEAP"** Letter No. 6

Dear Consumer:

When a commodity is sold for almost nothing we label it "dirt cheap." But is that the right expression? Just call up the neighboring handyman and order a few tons of dirt delivered to your backyard. He'll probably charge you a couple of dollars, which would be only a fair price

And now, suppose you wanted some three tons of water. Just open any of your spigots, any place, any time, day or night, summer or winter, exactly when you want it. You can have your three tons of water at the cost of exactly thirty cents—ten cents a ton. Instead of saying "dirt cheap" wouldn't it be more emphatic to say "cheap as water," for water, measured by whatever yardstick of value you care to use, is one of the cheapest essentials of everyday life.

W. L. Ciscet

Manager.

**RIVERTON CONSOLIDATED WATER COMPANY**

This is the sixth of a series of letters dealing with the service given on the West Shore by the Water Company

*Three of a Series of Advertisements Run in Newspapers by the Author's Company.*

it reaches his home. Most people want to know what makes the clock tick, notice the crowds around any demonstration. Occasionally some department store will have a miniature factory on its main floor and you will notice that women too will take time to watch its operation.

As further proof check over the magazine racks at any newsstand and notice how many are intended for the man who likes to tinker around and has a mechanical trend of mind. People are just as willing and anxious to learn the details of the water business; give them a chance to find out. Advertising is an effective way of getting this message across in brief space, quick reading.

There is another type of printed advertising in addition to paid-for newspaper space and accompanying free publicity stories. Where the organization is sufficiently large and funds permit, there is no better medium of bettering public relations by printed words than an effective house organ. Don't forget that your employees are also your consumers and that if you can get across to them the story of your company, they will discuss it with their friends and neighbors who are also, remember, your consumers. In other words, the employee provides a direct means of communicating with a definite proportion of your customers and the house organ is your direct contact with each and every employee on the payroll. It need not be an elaborate magazine. In fact, you can use a multigraph for your printing press and the biggest expenditure will be in time and thought.

Although this may seem contradictory to all that has previously been said, the insertion of a series of advertisements, represents but a very small portion of the opportunities which await Water Utilities in the building up of public relations. For every friend which will be secured through a paid advertisement there are dozens of others which can be secured by other means. The potential instruments for establishing these friendly contacts are already available within your own organization.

## Advertising Through Personnel

We often hear it said "A man is known by the company he keeps." Some one has reversed the phrase with equal truth; most assuredly, "A company is known by the man it keeps." Our customers cannot all meet the manager, and the character of our organization must be exemplified entirely by the one or two individuals with whom the customer happens to come in contact. In most instances the meter readers and the office cashier, who will also probably take care of the telephone, are the two individuals most apt to establish in the public mind the character of the company. The influence which they exert is tremendous. When one considers the number of telephone calls that are answered daily, the number of individuals who pay their water bills in person, and the dozens of households which are visited in the daily routine of the meter reader, one realizes that the most strenuous efforts of the executive staff is absolutely insignificant in comparison with the daily influence of these employees. The attitude of employees toward the public can make or break good public relations.

It is very easy to publish a smooth advertisement which glibly tells about service. Service has been talked about so much that any advertisement that discusses it without a basis of solid conviction, and a record to support it, will be recognized as insincere and do more harm than good.

The advertisement is worthless unless it is backed up by a convincing exhibition of service by all of your employees. Courtesy today is such a fundamental requirement in modern business that it must be taken for granted. In our line of public contact our customers, moreover, rightly expect a personal service over and above the mere physical service for which they pay. They demand a personal, sympathetic interest in their particular problem of the moment. And, the person with whom they are dealing, whether foreman, cashier or the manager, himself, should be able to give or to secure accurate, complete and understandable information which is so essential in settling problems, to the customer's complete satisfaction. A set of tariff rules that are comprehensive, fair and so clearly stated as to be immediately understandable to the person of average ordinary intelligence, is one of the greatest of advertising mediums. If it is a reasonable rule the intelligent customer will be satisfied with an explanation and readily convinced that there is a good reason for its application, and, if he has been courteously treated, is likely to let it be known to his acquaintances. It is astonishing to note how many people come into our office in regard to some complaint and who are generally surprised to discover the reason for certain rules of our company. They appear as though they have stumbled on something original and novel and as it is human nature to talk about anything out of the ordinary, the matter receives publicity. Whatever other errors you may commit, above all avoid preferential or discriminating treatment of any particular person. The application of a certain rule is the same for Smith as it is for Jones and it is decidedly bad advertising to have a rumor spread that particular favors are being shown to a preferred few. Any suggestion of this sort is repeated, exaggerated, and forms the worst form of publicity.

Every employee, whatever his position, should be completely familiar with and understand the reason for every rule. The most effective way of making a dissatisfied customer still angrier is to have the clerk put up a bluff or act in an arbitrary manner because he or she can give no reasonable explanation for some particular method of doing business—company policy. Such action advertises to the world that we don't know our business, and are out to take advantage of the customer. Make sure that every employee has been drilled in the why and wherefore of all our policies and business procedure. It will pay big dividends in good-will.

## Good Will Starts at Home

All of us have certain rules as to the type of employee we wish for certain positions, but over and above intelligence, neatness, courtesy, or whatever other quality you demand, the employee must be sold on the merits of his company. It is impossible to speak convincingly of something which you yourself believe only half-heartedly and it is therefore the job of every executive to make every employee, no matter how minor his position, feel that he is a vital, irreplaceable member of the company; that upon his particular efforts depends the work of the entire organization and that by his individual attitude our public is judging all of us, for the general public pretty shrewdly estimates that the type of employee reflects the type of company employing him. All of us are imitators and we subconsciously absorb the example of others; the average employee being a great deal more affected by what his superior does day after day than by what he occasionally says. You cannot expect your employees to maintain unfailingly courteous contacts with the public unless you too have unfailingly remembered to maintain the same thoughtful considerate relations with your entire personnel. The type, kind and character of the men who are crystallizing in the public mind

*Landscaping the River's Edge Cost Little.*

the character of your company is a reflection of the man at the top.

All of this seems to have been a rather laborious detour away from the subject under discussion, but what I wanted to bring to mind was the fact that before investing in headlines and columns of print, it is far more important to check up on headquarters and columns of personnel. Forget about public relations and first of all build up unshakable mutual confidence between employees and management. Create such a feeling of good will that in every last one of your men there will be a spontaneous feeling of confidence in his company and you will have welded together the most effective advertising force in the world—a group of satisfied, enthusiastic employees who thoroughly understand the company's ideals, policies and practices, proud of their work; and, by their constant high standards and devotion to their duties, will invite the respect and regard to everyone with whom they come in contact.

The head of a holding company tells me that before visiting a plant, he will get out his employee records so that he can greet all of the men as Joe or John, or whatever their nickname might happen to be. No matter how hurried, he always takes time to shake hands with the men and make some friendly remark—with what result? All of his men think that he is a prince and aside from the personal loyalty he has established, please remember this is darn good advertising. Joe probably tells his wife that the big boss was around that day and inquired about the family; she may relate the incident over the back fence. The neighbors in turn will be sold on what a grand organization Joe is working for and passes the news along. All of this good will was created through a hand shake, and a little thoughtfulness. Newspaper advertising alone, to get the same effect, would have to be mighty effective.

## Comfort and Happiness of Employees Important

Water works service is a tough assignment, a twenty-four hours a day, seven days a week proposition, and service can only be maintained by harmony among the employees and absolute loyalty to the company. Forget about regarding the men as employees and think of them more as plain human beings; show some consideration for their health and welfare. Very often a small expenditure will make all the difference between make-shift surroundings, and comfortable working quarters. It doesn't take much money for instance to install a shower. The washing facilities at their own homes may be rather meager and a good shower at the end of a hard working day is not going to lower their opinion of you. Group and co-operative insurance policies, sick benefits, nursing or hospital service and part-time payments during illness are all rapidly becoming a part of personnel work. Employees who have been incapacitated during employment or who have been retired after long and faithful service are certainly deserving of pensions. Such work is two-fold in its benefits. It improves working conditions and fortifies the employee's mind as to the hazards of the future. On the other hand, it is an invaluable lever for swinging public opinion to our side. In small towns news travels pretty quickly and what better advertisement could a company have than the presence of one of its old employees living comfortably in his old age on a pension given him by the company as his just due for many years of loyal service. The good will created by such an expenditure is the sort of publicity that cannot be purchased.

## A Case of Human Relations Making Good Public Relations

Sympathetic understanding and a little touch of human nature is an almost necessary requisite for public dealing. Last summer the wife of a consumer was in one of our offices in regard to paying certain bills. During the course of the discussion she casually mentioned that she was feeling rather badly and had in fact stopped to see the doctor on her way to the office. After the business was settled the manager got out his car and drove her home. She was not an acquaintance, in fact had never before been in the office, but she was elderly, feeling anything but well, and, therefore, deserving of consideration. This was a very simple human thing to do but it was appreciated beyond measure and since that time she has apparently made it her business to relate the incident to her large circle of friends as an example of the courtesy and consideration one may expect from the water company. Ordinary courtesy was all that was intended, but like many of our actions—it resulted in advertising.

## Every-day Advertising

We can't all establish taxi cab service for consumers but almost without exception we do have a company truck or a manager's car. What does yours look like? Is it playing hockey from the junk yard or does it always appear on the streets polished, cleaned and in first-class order? Don't forget that a glimpse of this truck may be the only indication that some consumers have of your physical equipment. You may have a $100,000.00 filter plant with the most modern equipment but it is more than likely that the general public will not see that. It will, however, remember a dirty car or a ramshackle, carelessly loaded truck standing along the ditch where your men are working. Even automotive equipment creates a definite impression; clean, carefully kept automobiles prove to be one form of good advertising. And,

*White Paint and Green Trim Did Much to Improve the Company Home and Plant Opposite.*

by the way, if among your employees there happens to be an individual with a hankering for the Indianapolis Speedway, flag him down now because broken speed limits, reckless driving, and irresponsible operation of a company truck is most decidedly bad advertising.

There are certain forms of advertising which you are getting whether you want them or not. Every bit of your property is a signboard for the public to notice. The fire hydrant on the street corner—what sort of a representative does it make for your company; is it well painted and apparently ready for use at a moment's notice, or is it rusty, corroded, battered and with a valve stem that has been "gnawed at" by many a Stillson wrench. Standpipes and elevated tanks are rather conspicuous objects against the skyline and a brightening up of such a land mark at sufficiently close intervals is going to increase company prestige. Impounding dams and storage reservoirs should get their share of attention, as their neat appearance and careful patrolling creates a definite and vidid impression on the public.

## Cleanliness Makes for Confidence—Beautification for Prestige

Many of us buy a certain product because of preconceived ideas as to its manufacture. Bakeries, for instance, stress the cleanliness of their manufacturing plants. Every loaf of bread springs forth from a general atmosphere of spotless tile, gleaming metal, white gloved hands, and cellophane wrapping. Whether such conditions exist or not one cannot tell but it does make the bread seem more wholesome and inviting. Again the dairy industry has us almost convinced that Grade "A" milk can only be secured after the pedigreed cow has been manicured, given a permanent wave, had her tail tied up with a pink ribbon, and then as a final precaution perhaps given a very mild anaesthetic. This idea has been put to you in various forms but how can it be applied to the water industry. The material we have to work with is disheartening enough. How can you convince the public that the questionable mess that enters the usual filter plant is converted into the clear, sparkling, odorless, tasteless necessity of life. Filter plant adjuncts are not very savory looking, sedimentation basins are usually muddy and a collection of algae or scum is apt to bob up at inopportune moments in a most unappetizing fashion. Filters too are unconvincing and watching a chlorine machine gulp its bubbles of greenish yellow gas into the water mains has never yet made anybody thirsty. What is the answer? Apparently with the actual process of filtration so disheartening the only thing to do is to set the stage so as to create the impression of surgical cleanliness and mathematical precision.

*Just a Bit of Beautifications of the Filter Plant Grounds. Once a Dumping Ground, Now a Lily Pond.*

*The Filter Plant and Power Dam, from Down Stream.*

It has been tried at one of our Pennsylvania properties in particular. The low brick structure has been painted white to harmonize with an adjoining stone mill, window frames and door are green and a white picket fence completes the cottage idea. Inside, white walls, green trim, and pale cream ceilings meet the eye. Within the mill, which is now a storage for large fittings, everything is white, a generous coat of whitewash doing away with the accumulated mustiness of generations. Formerly the company property adjoining this plant was used for nothing better than a bramble heap and a semi-public dump. Today the tract has been cleared, graded, and the ground work laid for a real landscaping program. Where formerly a shack of tar paper and half rotten boards struck the eye, today there stands a rock bordered lily pond. Around its edge winds an inviting flat stone walk, carrying one's attention toward the neighboring creek. By next year we expect to have made a real beauty spot out of this area and early in the spring will establish evergreens, and shrubbery. With only a comparatively small outlay we have transformed a public eyesore into a much noticed part, for thousands of tourists use the Susquehanna Trail and we hope they will heed our welcoming sign to stop, enjoy the shade, and partake of the water furnished by that particular company. By considerable thought and but little expenditure, we have made the property more valuable, have benefited the community, made driving along that road a little more pleasant, and have moreover put up for all to see a very definite indication that our plant is clean, inviting, and has a hospitable individual personality. What more effective advertising could be sought?

When this work is completed and every nook and corner can stand the most critical gaze, we are going to have high school classes visit the plant and find out for themselves just how the transformation of a muddy stream into a safe and potable supply is done. The guide and spokesman on these tours will be the District Engineer of the State Health Department. In this way quality of water, methods of preparation, the implied supervision and partnership of the State itself, will all be put across in one visual advertisement. Reaching the children in most instances also reaches their families and so gives a coverage and discussion value which few newspaper advertisements could hope to equal.

## Advertising Through Civic Organizations

In the various trade magazines one reads reports covering technical conventions and meetings—some national, some merely local in their scope. To the layman these gatherings sound quite impressive. In his own com-

munity the local manager may be regarded as a fairly unimaginative, unimpressive figure. Encourage him to be heard at one of these conventions, have him read or discuss a paper, and what is equally important see that the local newspaper knows of it and gets an abstract of the local manager's remarks. His stock will soar and the public will think that if he was able to hold the attention of men from communities of more importance than their own that he amounts to something and moreover reflects credit on their town. In other words, company participation in water works discussions is good advertising—make full use of it.

The relations of your company with the State and local municipal authorities are worthy of attention. These elected representatives of the people pretty carefully reflect the attitude of their constituents and a little thought in the way they are approached may mean a great difference in public relations. The acquaintance of fire chiefs and members of the various boroughs' subcommittees, is also worth fostering and even so trivial a matter as inviting a representative of the local fire company to be present when fire hydrants are flushed is a convincing advertisement of the company's desire to co-ordinate this work to meet the approval of the borough.

Another effective field of word-of-mouth advertising is the local Parent-Teachers' Association, Civic Club, or various women's clubs. Anything pertaining to civic advancement is within their province; but, to them, perhaps the water supply is still a closed book. Perhaps they would be interested in actually seeing the filter plant or possibly, as in one instance we know of, a paper was prepared by the Water Company covering the entire subject of filtration and read by the President of the Association at a meeting held in the high school. The local Health Board certainly should be interested in the preparation of water and become familiar with the workings of your company. Contacts of this sort are endless and represent short cuts in effectively reaching the greatest possible number of consumers. Make the leaders of the community feel that you need their assistance and co-operation, that their suggestions are welcome, that they are part of your organization, and you will have immediately added to your personnel, without salary, the most hard working, high pressure press agents that can be found.

Examples of this sort may be multiplied indefinitely, a few moments' consideration will bring to mind any number of possibilities for bettering the impression which your company is creating in the public mind. Put yourself on the other side of the counter, be a consumer, and with the consumer's attitude make contact with your organization, the results may be surprising. All sorts of little things go to make up the eventual impression. Is the office bright, well lighted and clean, the desks neatly arranged and orderly; does the cashier immediately wait on you, does she glumly take the bill in silence or is there a cheerful "Good Morning" or "Good Afternoon"? Is there merely a mumbled "Thanks" or is the customer or his agent made to feel that the payment of the bill was really appreciated. Are groups of employees standing around talking or giggling or does everyone appear busy? These are all trivial details but blended together they create a definite character for your company and represent a picture noticed by every consumer entering the office.

Development of personnel, the cultivation of friendly public relations, and intelligent advertising, are really three phases of the same subject. Individually they are important, together they are vital to the continued growth of your company. Conditions vary in every community and you yourself will have to be the judge as to which one of these three considerations most urgently demand attention.

## The Logical Formula

To us the following seems to be the most logical formula to follow: Put your house in order, dispose of the obsolete and inefficient, repair what must be retained and see to it that everything is placed for the greatest ease in operation. Then, paint up and insist that thereafter everything be maintained in ship-shape order. Do the same thing with your personnel. A coat of paint can't be applied here, but where necessary neatness of appearance and a fresh viewpoint can be put across. See that everybody understands their work, understands the company policy and is convinced that they are working for the best organization in town.

You are now ready to go after public opinion and with such a basis you are bound to receive a favorable reaction. Then, try newspaper advertising and make them sincere, personal, and to the point. Remember each advertisement is to be a "close-up" of some particular phase of your work. The advertisement will attract attention for a brief time after its appearance but the momentum so gained must be kept up and increased by the work of your personnel. They are the folks, who by their consistent courtesy and service to the public, are your perpetual advertisements. Preach the motto that "Public Relations Are Human Relations." Don't expect to try this plan for only a few months and expect permanent results, the work must be kept up day after day, year after year, and always must you be looking for new opportunities for service.

In short, keep putting your best foot forward and let the world know about it—that's advertising.

▼

## W. W. Brush Assumes Editorship of Water Works Paper

Wm. W. Brush, for some years Chief Engineer of New York's Department of Water Supply and recently retired, has been made editor of Water Works Engineering. For several years he has served Water Works Engineering as the head of its Editorial Advisory Board and upon retirement from active service with the New York Department has been elevated to the position of Editor.

▼

## A Correction

In the article by L. F. Warrick in our October issue—"Cannery Waste Treatment in Wisconsin"—an error in stating the cost of treatment appears on Page 347. As printed, the cost is shown as being "34 to 78 cents per case of No. 2 cans of peas." These figures are in error, the cost of treatment of pea canning wastes by chemical precipitation in Wisconsin being actually 1/100th of that shown, viz., only 0.34 to 0.78 cents per case of No. 2 cans of peas.

Will readers please apply this correction by inserting the decimal points in their copies of our October issue?

# THAWING FROZEN SERVICE PIPES

By REEVES J. NEWSOM
*President. Community Water Service Co., New York, N. Y.*

*Reeves J. Newsom*

MOST water works operators now active in this work found the problems resulting from frozen services and mains to be more acute in the winters of 1917-18 and 1933-34 than in any during their experience.

In comparing these two periods and in seeking to analyze the causes resulting in severe freeze-ups, it develops that certain factors definitely contributed to produce the extremely trying and costly experiences such as so many water works plants have passed through this last winter.

The observations and conclusions presented in this paper are based on a study of data and conditions in that section of the United States within the boundaries of Pennsylvania, thence northerly to the Canadian line and easterly to the Atlantic Ocean.

A study of temperature, snowfall and precipitation data as recorded at Boston, Albany, New York, Buffalo and Pittsburgh, plus some observations at intermediate points, reveals certain pertinent facts.

At Boston the temperature in the winter of 1917-'18 was on the average 9.1 degrees below normal against an average of 8.4 degrees below during the past winter. The difference, however, was more evenly divided over the three months period in 1917-'18. The differences in snowfall and early fall precipitation, however, are more decisive. In the 1917-'18 period the snow was 12 per cent below normal, whereas, in 1933-'34 it was 53 per cent above normal. As a result, the freeze-ups were much more severe sixteen years ago in this territory than in the past winter, if we exclude cities well north of Boston. In the latter, the increased amount of snow removal to keep roads and streets open for automobile and truck traffic resulted in more difficulty being encountered with frozen mains in certain cities in New Hampshire and Maine during the past winter than in 1917 and 1918.

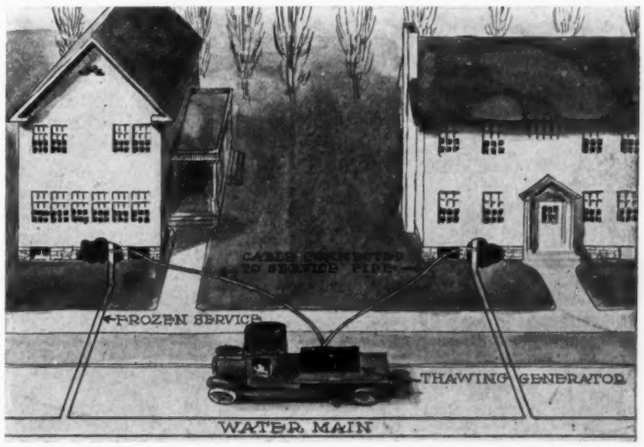
In many places, where CWA projects were under way, street grades had been lowered leaving only a shallow cover over mains and services and in other places sewer trenches were left open, exposing water services, while a delayed allotment of Federal funds was awaited to carry on the work. Such a condition resulted in making freezing troubles much more pronounced.

The same type of comparative conditions prevailed, in general, in the Albany and New York districts and in the southerly portion of central and eastern Pennsylvania as was the case in the Boston district. In the general vicinity of Pittsburgh and Buffalo deficient snowfall, combined with a greater degree of snow removal and the adverse effects from various Federal projects, resulted in more freeze-ups in the winter of 1934 than in 1918. This was especially true in the vicinity of Oswego, N. Y., where a great amount of costly maintenance and replacement work was required. There was also an area including Williamsport, Pa., and northward and eastward where the almost complete absence of snow brought about such severe freeze-ups and such wastage of water that in certain small communities the higher parts of the territory served were without water for days.

## Meter and Service Freezes

Because of sustained low temperatures for long periods during the past winter there were more meters frozen than ever before. The very low minimum temperatures, which broke all previous records in many places, reached and froze meters which had always before been considered set for adequate protection. On the other hand, the total excess pumpage of water was considerably less than in 1917-18 because the extreme cold did not start soon enough to cause the longer period of pumping to counteract wasting of water experienced in that year, or to allow the practice of running water to waste to prevent freezing, to spread as widely.

In the majority of cases during the past winter, frozen services occurred principally where they had been laid with less cover than called for in regulation practice of the utility or where the cover had been reduced by regrading. In the 1918 period it was common practice for the street car plows to pile snow high between the outer rail and the curb thus adding to the cover, whereas, as the result of the widespread substitution of buses for trolley cars and the more common use of snow loaders, service freezes occurred unexpectedly at points where safety was assumed.




*A Service Thawing Hookup to Thaw Two Services at One Operation.*

## 1918 Experience Forgotten Too Quickly

Immediately subsequent to the experience of 1917-'18, the discussion of preparedness for the recurrence of such conditions was widespread, and the avowed purpose to lower shallow mains and services and to purchase engine driven generator outfits for thawing operations was commonly declared. But, as the winters came without an immediate recurrence; and, because money to take these steps was always difficult for a superintendent to obtain, most operators gradually became forgetful of the hardships of that terrible winter of 1918. And, had it not been for the development of equipment entirely without the province of the water-works man, we would have been as badly off this past winter as if the previous lesson had never been learned. It so happened, however, that the modern and more or less common electric welding outfit had the voltage and amperage range which was required for the average service thawing job and these portable engine driven generator sets were available to save the situation for many water-works managers and superintendents.

## Electrical Thawing the Most Practical

The most rapid and economical method of thawing has been by the use of electric current. The most commonly used scheme of electrical thawing has been to get the local power company to mount transformers on trucks and to connect to existing power lines in the streets. The cost of this method is apt to be greater than the use of other types of electrical equipment, but there was usually not time to get other equipment after the freeze-ups began. In outlying districts no power lines were available in some cases, and other methods had to be resorted to. Engine driven generator sets especially designed for the purpose were only occasionally available, but the modern electric welding outfit was found to have approximately the voltage and amperage range required for thawing services, and where these outfits were used for thawing mains two of them were generally used in parallel.

A third type of electrical equipment which was effective for short services, where connections could be made close together, was a small portable transformer with a capacity of about 150 amperes at 20 volts. On some systems a surprising number of services were successfully thawed with equipment of this type—the current being taken through the residence wiring outlets.

Where only a few frozen services were encountered or where electricity was not available; or, where it was ineffective due to rubber gasketed couplings, new lead substitute joints in the intervening main pipe, or lack of capacity to thaw copper services, steam and hot water were used. One man can operate the steam outfits and do the thawing.

*Mobile Welding Generator Set Thawing Frozen Service Lines.*

Steam is effectively used by generating it in a small portable boiler and feeding it under about 10 lbs. pressure through a ⅛ inch copper tube or 3/16 inch block-tin tubing. It is successful for only relatively short straight pipes where the steam jet can be advanced against the ice face as it melts. Where sharp bends are encountered and the tube cannot be advanced, the steam will not carry forward through the melted ice. Also, if the length of the service is too great the steam condenses in the tube before reaching the ice face and is not effective.

Hot water is, in general, more satisfactory than steam, though it requires two men to operate the equipment—one to push the tube into the pipe as the melting of the ice advances, and the other to operate the small force pump required. This method can be used on a longer service than the steam process and the hot water will carry farther beyond the end of the tubing when it meets an obstruction than does steam.

Small sections of 4 inch main about 75 ft. in length can be thawed by this method and if ⅜ inch iron pipe is substituted for the copper or tin tubing, the length that can be thawed can be approximately doubled. Where relatively new lead-substitute (compound) joints are encountered, preventing the use of electrical thawing, this becomes a valuable method of thawing larger mains also.

## Time Required for Thawing

Experiences during the past winter indicate that the time required for thawing services by all three methods varied through a wide range. Where equipment of adequate capacity was available for electrical thawing services were often thawed in from three to ten minutes and small mains in from one-half to two hours. Both hot water and steam thawing require a considerably longer time than this. However, in many instances, because of lack of experience and precedent, many jobs of thawing of both long services and mains were attempted without adequate equipment; and, as a result, two or three hours were often spent on a service and as long as ten or more hours on a main.

## Cost of Thawing Operations

The cost of electric thawing was made up of many combinations of charges. In cases where hook-ups were arranged with the local power company, the charge was sometimes a stated amount per service or an hourly charge for the equipment, with or without a current charge. Welding outfits were supplied both on a per service basis and an hourly charge for men and equipment. The cost commonly varied between $2.50 and $7.50 per service for electric thawing, and the use of hot water and steam applications also came within this range. A common charge for welding outfits was $4.00 per hour, although it varied from $2.50 to $7.50 per hour.

## Difficulties Encountered

One of the principal difficulties encountered in thawing by electricity has been the occasional inability to get a closed circuit through the pipe or main that will carry sufficient current to produce the required heat. The most common cause of this type of trouble is the presence of lead substitute joints in the section of main between the frozen service and whatever point is used for the circuit making connection. The weight of evidence from past experience appears to show that new lead substitute joints definitely will not carry sufficient current for thawing. Depending somewhat upon the char-

acter of the water, joints of this type in about five years will have formed, by corrosion of the iron in the bell and the material itself, a contact that will carry the current. This contact is somewhat fragile, however, and if too large an amperage is forced through it, it may burn through and break the circuit or create arcing and damage, after which other means than electricity will have to be used. To avoid this, it is necessary to keep the amperage below 200, or probably 150, and keep the current on for the extra time required. Rubber bushed repair couplings or joints are another reason for being unable to get a closed electric circuit, and, except in rare instances, time does not seem to produce a satisfactory current carrying contact unless much higher voltage is available than is needed for ordinary thawing work.

Failure to ascertain that there is no other path for the current to take than through the service line may lead to failure in thawing, even though the ammeter indicates that the proper amount of current is flowing. In some cases the current has taken a path through the house wiring and has heated the small wires (and BX cable carrying them) hot enough to set the house afire. It is not sufficient merely to detach the ground wire that is customarily found near the cellar wall, because other ground connections may be present elsewhere. *A complete disconnection of the piping system from the service line, by removal of a fitting or the meter, is the only safe course.*

Another trouble sometimes arises due to a poor contact at some joint in the main whereupon so much current goes through a small area that the jointing material is melted out and a water leak results. Bad tastes and odors in the water after thawing are frequently encountered.

## Necessary Consideration in Successful Thawing

The thawing of services and mains by the use of electric current will be more uniformly successful if water works operators will bear in mind the fundamental characteristics of current flow and energy transference. Amperage is the measure of quantity of current flowing and is the most important element to consider because on the one hand the heating effect desired is principally dependent upon the flow of a sufficient number of amperes of current and, on the other hand, damage to joints and pipe is caused by too great an amperage. Voltage is the measure of electric pressure which is driving the current through the pipe. Voltage is therefore important only because of the amperage which it will force through the resistance of the pipe and joints. Ohms are a measure of resistance—i.e.—electric friction. The relation between the three is expressed as Voltage equals Amperage times Ohms. Thus, the greater the resistance, the greater must be the electric pressure (voltage) to force through a given amount of current.

Resistance, therefore, if it be in the joints, is a detriment to current flow and to the thawing. But the resistance of the material of the pipe to be thawed is useful in thawing, for ultimately it is the heat, produced by the force of the current, that melts the ice, and the greater the resistance, the greater the heat produced by a given amount of current forced through.

The transference of electric energy into heat in a conductor takes place according to a law first stated by James Joule, an English physicist. According to this law, the heat produced is directly proportional to the resistance of the conductor, the square of the amount of current and time the current is flowing. Thus it will be seen that a material which is a poor conductor and offers greater resistance to current flow will get hotter than one which is a good conductor. Also, a relatively small increase in amperage will greatly increase the heat produced as the variation is as the square of the amperage increment.

It would appear from this law that any difficult job of thawing could be done by merely continuing the current flow for a long period, and to a limited extent this is true, but it must be remembered that the heat produced in the pipe is immediately dissipated by the ice inside and the cold soil on the outside. Therefore, for any rate of heat production there is a point reached where it is dissipated as fast as produced; and, if in a reasonable time the pipe line is not thawed it is safe to conclude that too much of the heat is being lost through the soil and mere continuance of this condition for a longer time will not bring success. More heat must be provided and since the resistance of the pipe cannot be controlled, increased current flow (amperage) is needed. To secure this additional flow of amperes an increase in the electrical pressure (voltage) is necessary.

As a result of this law of Joule's, it can be seen that a copper pipe, being a good conductor, can only be heated by passing a considerable amperage through it and for a longer time than in the case of other materials (such as iron) which are not such good conductors. Comparing the resistance of the various metals used for water pipes, in order, copper is the least resistant. Considering copper as 1, steel is 7, wrought iron is 9, lead is 12, and cast iron is 73. Since copper has 1/7th to 1/9th the resistance of steel and iron and 1/12th that of lead, it is necessary to put through at least twice the amperage for approximately twice as long a time in order to thaw a length of copper service pipe as is required for the same length of steel pipe.

## Experience

Experience has shown that from 200 to 400 amperes (varying with the diameter) will thaw iron, steel or lead services in from three to ten minutes. Depending upon the character of the connections, the type of joints in the mains and other elements of resistance, the voltage necessary to force such a current flow through the circuit will vary from 10 to about 60 volts. To thaw mains, amperages of from 400 to 700 are likely to be required at times. In view of the larger area of metal in these pipes it is fortunate that cast-iron has high resistance to current flow, else it would be impossible to produce sufficient heat with any practical portable electrical apparatus.

To produce a current of 400 amperes at 60 volts requires about a 25 k.w. generator, although one with a capacity of 30 k.w. is better. The gasoline engine driving it should have a rated capacity of at least 50 per cent more in order to sustain the output for several hours in case difficult main pipe thawing is encountered.

If current is taken from the 2300 volt lines of the local power utility and is stepped down to 110 volts, the transformers should have at least a total of 75 KVA capacity if mains are to be thawed, because it is occasionally necessary to use higher amperages than the averages stated and also to maintain the current flow for several hours. A 25 KVA transformer is usually ample, however, for the thawing of services. It has been observed that AC current is more effective than DC in thawing because the vibration set up by the former is of material aid. The necessary small amount of melting near the pipe surface takes place with less actual temperature rise in the pipe.

*Acknowledgment:*—Excerpts from a paper presented before the American Water Works Association.

*Poplar Root Removed from 10-Inch Sewer at Delmar, N. Y.*

# MEETING OF THE N. Y. STATE SEWAGE WORKS ASSOCIATION

ONEONTA, N. Y.—"The City of the Hills"—dressed in autumnal splendor, proved to be a capable host to the New York State Sewage Works Association at its two day meeting October 5-6, 1934. The 111 members and guests attending were well repaid by a balanced program of technical papers and discussions of operators' problems, followed by an inspection trip to Oneonta's new sewage treatment plant.

Much credit is due the local committee, with genial "Bill" Watkins, Supt. of Water Works and Sewerage in charge, for arranging accommodations and entertainment for the members and guests. A clam-bake and entertainment and dancing at the Elks Club provided a welcome divertissement in the evening.

Several states were represented at the meeting but the outstanding guests were Dr. Ernest John Hamlin, City Engineer of Johannesburg, South Africa, who had brought with him the charming Mrs. Hamlin. Dr. Hamlin was good enough to make a few informal talks dealing with experiences and problems encountered in the disposal of sewage in this distant municipality.

*E. B. Besselievre, The Dorr Co., New York City, President of the Association.*

*W. W. "Bill" Watkins, Superintendent, Water Works and Sewerage, Oneonta.*

## Business Meeting

(President, E. B. BESSELIEVRE, Presiding)

The Convention opened with a business meeting, in which a discussion on the "Rating of Sewage Treatment Plants," prepared by C. A. Emerson, Jr., was presented by Wellington Donaldson. Following an open discussion of this interesting subject is was voted to appoint a Committee to investigate the feasibility of adopting some system of rating sewage treatment plants and bring in a report at the winter meeting of the Association in New York City.

*Frank Surney, City Engineer, Oneonta, N. Y.*

*John S. Warde, Rensselaer Valve Co., New York (His First Sewage Works Convention).*

## Papers and Discussion

In the first paper of the meeting, Morris M. Cohn, Sanitary and Testing Engineer of Schenectady, proposed "The Combined Collection and Disposal of Sewage and Food Wastes." He reviewed the possibilities of using the sewer system and treatment plant to handle both sewage and garbage wastes, pointing out the similarities in the two types of wastes and showing that garbage was even now to a considerable extent a normal constituent of sewage. In the scheme suggested a small household grinder would be placed in each home to prepare the garbage for discharging into the sewer system, thereby producing a rather radical departure from the long-established principle that the disposal of garbage and sewage are essentially two separate and distinct problems.

Glenn Holmes, Consulting Engineer of Syracuse, in discussing Mr. Cohn's paper, gave encouragement to further study of the novel idea proposed and reviewed some of the problems which might be encountered. He reported on a test of garbage disposal via the sewer at Syracuse but the garbage-sewage sludge was not subjected to digestion.

W. A. Ryan of Rochester felt that anything out of the sewage should be kept out and cited troubles from

*Geo. R. Solomon, Construction Engineer, Troy, N. Y.*

*W. H. Pitkin, Oliver United Filters, New York City.*

cannery wastes, both in physical handling of such material and in maintaining proper pH condition in the digestion tanks.

**"European Sewage Treatment Practices"**—A. J. FISCHER, Dorr Company, New York City.

Dr. Fischer presented some very interesting comments on sewage treatment practices in Europe, as observed during his recent visit. In many municipalities he had found antiquated methods of handling grit, sludge, etc., still in use, but in the newer installations mechanical equipment was finding a place. Grease removal tanks are more efficient than in this country, due primarily to better design and baffling. Aeration in ridge and furrow type of tanks predominates in activated sludge treatment and long period aeration is necessary because of the more concentrated sewage.

All trickling filters observed were of the revolving or traveling distributor type. Various types of digestion tanks were found with heating provided by rotating heating coils, by steam, or sludge preheating before its addition to the digesters. Lagoons continued to be used to a great extent for sludge disposal, and underdrained sludge beds were not common. Utilization of sludge gas in power development had proceeded to a marked degree at Birmingham, England, and also in Germany.

## Sewage Treatment at Johannesburg

The high-light of the meeting was Dr. Hamlin's discussion of the problems of sewage treatment at Johannesburg, South Africa, a city of some 500,000 inhabitants. Being located on the watershed divide between the Atlantic and Pacific oceans, local topography had made it advisable to construct five separate treatment plants at Johannesburg.

Water being at a premium (about $1 per 1,000 gallons), a very concentrated sewage was the result. In consequence, bar screens had to be placed at an angle of 25 degrees or less from the horizontal in order to increase cross-sectional area and to prevent matting of paper, etc., on the bars and consequent backing up of the sewage. With the flat slope paper would be pushed (rolled) to the upper section of the screen. This strong sewage also necessitated continuous removal of sludge to prevent septic conditions in the settling tanks.

At activated sludge plants the wasted sludge is taken out by delivering it one-half mile up the sewer, a method which tends to deodorize the raw sewage and produce a readily settleable floc, and an increased settling tank efficiency of 15 to 20 percent.

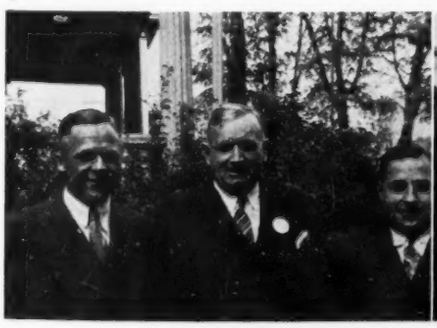
Before adopting diffused air aeration, an experimental plant using various methods of obtaining the necessary air had been operated for a period of two years. Since the city of Johannesburg is 6,000 feet above sea level, the solubility of oxygen in the sewage was considerably less than at lower altitudes and the rate of evaporation is also extremely high. Under such conditions mechanical aeration processes were able to operate with only 35 to 40 percent of normal efficiency as observed in less rare atmospheres.

Many of the natives, he said, did not live in houses and subsisted largely on crushed corn, frequently eating as much as four pounds a day. Much of this material was excreted undigested, and in the sewer system produced rapid fermentation in the settling tanks and frequently acid conditions in the digesters.

The city having in general a segregation of the various industries, a different type of waste was received at the various treatment plants and presented distinctive problems. Illustrating the unusual strength of the sewage, Dr. Hamlin cited a content of 24,000 p.p.m. (8,000 p.p.m. average) settleable solids reaching the plant receiving the wastes from the abattoir district. Another plant treats primarily laundry wastes, another the wastes from gas works, and the remaining two had to handle ordinary domestic sewage. The problems were therefore principally those of treating industrial wastes and only incidentally sewage.

The concentrated sewage, which averages 25 gallons per capita, requires not less than a 16-hour period of aeration and 4.5 cubic feet of air per gallon. The secondary tank effluent was being filtered through sand beds and chlorinated to maintain 0.1 p.p.m. residual chlorine.

Dr. Hamlin said that $190,000 had been appropriated to study methods of sewage treatment and they had been fortunate in having Harold Wilson, formerly connected with the Reading and Manchester studies in



*W. Fisher, F. C. Schmitt, C. Springart, of the Rochester Sewerage Dept.*

*Holmes, Dr. Hamlin and Wagenhalls. Dr. Hamlin Is City Engineer of Johannesburg, South Africa.*

*E. A. Bell and A. Slavin, N. Y. City. Designed and Supervised Construction of Oneonta's Plant—the Former Having Charge of Early Operations.*

England, as the chemist in charge of experimental work and plant operation. Amongst the experimental work, had been a study of the compression of sludge gas into cylinders and the use of this gas as fuel for operating the city trucks. He thought that the expression of power consumption in terms of horse-power per million of sewage treated was unfortunate. A logical comparison would be horse-power per million pounds of oxygen demand taken out, which is more appropriate and more readily compared. In planning research, there had been the finest sort of cooperation between his staff members, which held weekly meetings to review plans and discuss progress. That sort of thing stood for real happiness and sound developmental work by his organization.

## Symposium on Sludge as Fertilizer

William A. Ryan, Sanitary Chemist, Rochester, N. Y., opened the discussion by reviewing the development of the use of sludge as fertilizer in Rochester. In 1918 sludge was given away, but the present price was 50c a ton at the plant. A comparative analysis of sludge from the Rochester plant and barnyard manure showed that only in nitrogen content did sludge excel, but the value of sludge as a soil conditioner was emphasized as an important factor to consider. He recommended the use of sludge for crops maturing above ground, but felt that it would be necessary to process the sludge removed from drying beds in order to further commercialize its use.

"Charlie" Agar presented a discussion by Arthur Cary, Superintendent of Public Works of Fairport, citing experiences with sludge from this plant. At the Fairport plant two small plots of gravelly soil were covered with sludge in 1932. In 1933 the land was used satisfactorily for tomatoes and coniferous trees. This year one plot without any further fertilizer yielded an exceptional crop of cabbages, beets, beans, peas, tomatoes, swiss chard, squash, and watermelon, in spite of an unusually dry season. The second plot, as a flower garden, gave similar results.

T. J. Smith, Superintendent of the Newark, N. Y., plant (activated sludge), told of a three-year contract involving removal of the digested activated sludge from the drying bed by a local nurseryman at $5.00 per ton on a dry basis. It was expected that this will represent $1,200.00 yearly saving in operating cost. A typical analysis of this sludge shows a nitrogen content of 3.69 percent; phosphates, 2.65 percent; and a small amount of potash.

John R. Downes, Superintendent Sewage Treatment, Plainfield, N. J., related experiences at Plainfield, N. J., where sludge, used on marked-off sections, was of value for seven years after the initial application. At the present time sludge was being dehydrated in a spray drier which renders the material in excellent condition for marketing as a fertilizer.

*John Lawrence, Commissioner of Public Works, Liberty, N. Y.*

*"Tom" J. Smith, Chief Operator, Newark, N. Y.*

C. A. Holmquist stated that at Atlantic City the dried sludge is ground, bagged and sold for $25.00 per ton. At Pasadena, Calif., the sludge after vacuum filtration and drying brings $15.00 a ton.

C. G. Wigley of Atlantic City discussed experiences in marketing sludge in the middle-west, particularly at Dayton, Ohio, and Grand Rapids, Mich. At the latter City the product was being marketed as "Rapid-Gro" and could be purchased even in small packages in the 5 and 10 cent stores. He emphasized the value of properly conditioned sludge as compared to the non-uniform crude material.

Ten years' experience at Schenectady was recounted by Morris Cohn. A revenue of about $200.00 a year is obtained, and to this must be added a saving of about $500.00 a year in the handling of the material from the drying beds of the dump.

C. C. Agar told of a unique use of sludge from the Rome plant, where a dealer in top soil and loam secures sludge for 50 cents a yard and after two years' seasoning on stripped land harvests another crop of top soil which he sells for $3.00 a yard.

*Sewage Treatment at Oneonta, N. Y.*—12pt Kabel bold

A comprehensive description of the new sewage treatment plant at Oneonta was presented by Abraham Slavin, Consulting Engineer, New York City. The plant consists in general of a mechanical bar screen, four settling tanks with mechanical sludge removal equipment, chlorine reaction tanks, pumping station, two sludge concentrating tanks with floating covers, two digestion tanks

**Inspection of Oneonta's New Plant (In the Rain)**

*Left: Automatic Bar Screen. Center: Clarifiers. Right: "Bill" Watkins (No Hat) Wonders If Ever a Plant Was Built That Had No Foaming Troubles When New.*

*Arnold Hale, Plant Operator, Rochester, N. Y.*

*M. C. Fleming, Hardinge Co., York, Pa.*

with concrete roof, gas collection and heating equipment, and glass covered sludge drying beds. It was designed to serve 20,000 and was completed in November, 1933, at a cost of $185,000.00 The gas utilization equipment is located in a separate building and consists of meters, drip pots, flame traps, and gas boilers, all in duplicate.

Unique features include the self-enclosed mechanical Rex bar-screen unit with a time clock for intermittent operation, the sludge and scum collecting equipment in the Hardinge traveling bridge (Meider) type. A tidal gate and sewage pumping station automatically operates during high stages in the Susquehanna River.

In discussing Mr. Slavin's paper Frank Gurney, City Engineer of Oneonta, reviewed the history of plans for sewage treatment for the city and described the changes made and difficulties encountered during construction of the intercepting sewer and treatment plant.

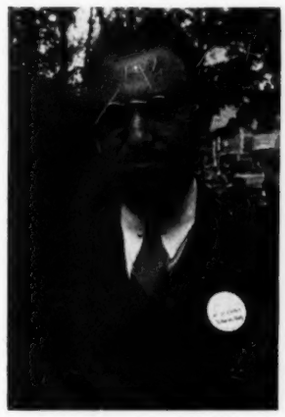
M. C. Fleming, Hardinge Company, York, Pa., described the Hardinge sludge collecting mechanism, the bar screen manufactured by the Chain Belt Company and the floating sludge concentrator covers and the combined condensate, flame and relief traps of the Pacific Flush Tank Company.

## Operation of the Oneonta Plant

W. W. Watkins, Superintendent of Water Works and Sewerage, presented an enlightening discussion on the trials of an operator during the "breaking in" period of a new plant. Because of the presence of some storm sewage which had not been removed from the sanitary system, sewage flows had ranged from 2 m.g.d. to over 7 m.g.d., average 247 gallons per capita for a population of 13,000, while the water consumption averaged only 134 gallons per capita. Unusually high flows during April give difficulty at the plant, particularly at the screen chamber, where as high as 66 cu. ft. of screenings were removed each day compared with a normal of 6.25 cu. ft. Elimination of leaks from a mill race into an old sewer reduced the flow by more than 500,000 g.p.d.

Difficulties with sludge removal from the hoppers of the settling tanks were being corrected by installing false bottoms to convert the 45 degree slopes to 60 degree slopes into the pit at the inlet end of the tanks.

Inasmuch as the plant was placed in operation during cold weather, very little action took place in the digesters until this summer, when digestion started vigorously. During the winter 100 to 200 pounds of lime were added with the sludge pumped each day, maintaining thereby a pH of 7.0 or more. About July 1st there was a sudden drop in pH and gas production started actively but the gas would not support combustion. Lime additions were continued at higher rates and during the latter part of August at rates as high as 2,000 pounds a day. On September 1st the gas had been placed in use to heat the digesters, which continued to work vigorously. Blowing of water seals and forcing of sludge out of the tank seals had recurred frequently. It was his thought, however, that normal digestion would be developed before cold weather sets in.



*Morris M. Cohn, Schenectady, N. Y., Vice President of the Association.*

*John R. Downes, Plainfield, N. J., Gets a "Movie" of the Skimming Mechanism at Oneonta's Plant.*

E. A. Bell, who served as Resident Engineer during construction, discussed the first three months of operation of the plant when he found the nice new chairs of little utility during that period.

## Sun-Rise Breakfast

At the now famous "Sun-Rise Breakfast" Charlie Agar presided and propounded a miscellaneous assortment of timely questions from the "Question Box." Questions in regard to screenings, disposal and control of roots in sewers evoked the most interest. In reference to screenings, one school of thought clung to the principle that what is taken out of the sewage should be kept out, while the proponents of grinding and return of the macerated screenings to the raw sewage claimed advantages of that method of disposal. It is still a "question."

*Dr. and Mrs. E. J. Hamlin—Honored Guests of the Association. Dr. Hamlin, City Engineer, Johannesburg, South Africa, Is in America Visiting Sewage Treatment Plants and Other Sanitation Works.*

*Lake Waco—Created to Free Waco, Texas, from Water Shortage and Treatment Difficulties; Has a Dual Value in That Regulated Recreational Usage of This "Lake of the Prairie" Is Permitted.*

# SOUTHWEST WATER WORKS ASS'N, VOTES TO JOINS AMERICAN

THE 23rd Annual Convention of the live Southwest Water Works Association was held Oct. 15-18 in Waco,* Texas, with a registration of 250.

Organized in 1912 to serve the Great Southwest, its 5th Annual Convention was also held in Waco in 1916, at which its "Grand Old Man of Water Works" and Honorary Member, Jesse Shaw of Tyler, Texas, was re-elected President.

Present at this 23rd and last Convention of the Southwest Association as an independent group, both Mr. Shaw and "Pat" Bracken, its first president, witnessed the vote of the association to consolidate with the American Water Works Association on Jan. 1, 1935, by becoming its Southwest Section. Thus, will both Associations benefit by this important union for strengthening the organization and advancement of the profession.

Considered an outstanding Convention from many angles, much of a progressive nature was accomplished under the guidance of Pres. W. H. Vaughan, at the Waco meeting. Houston was chosen as the Convention City of 1935, and John B. Winder, Supt. Water Works, Dallas, Texas, was unanimously elected the Southwest Association's last president and the first of the Southwest Section of the American Water Works Assn.

## Officers Elected

President—John B. Winder, Supt. Water Works, Dallas, Texas.
Vice-Pres.—Geo. J. Rohan, Supt. Water Works, Waco, Texas.
Sec'y-Treas.—Lewis A. Quigley, Supt. Water Works, Fort Worth, Texas.
Governing Board:
*Arkansas:* Henry E. Nunn, Supt. Water Works, Van Buren, Ark.
*Kansas:* M. E. Linton, Water Commissioner, Topeka, Kan.
*Louisiana:* R. H. Brooks, Supt. Water Works, Ruston, La.
*Missouri:* J. W. Everett, Mgr. Water Works, Springfield, Mo.
*Oklahoma:* Thos. G. Banks, Engr. & Supt. W. W., Oklahoma City, Okla.
*Texas:* Albert R. Davis, Supt. Water Works, Austin, Texas.

## Inspection Trip and Entertainment

One day was devoted to a trip of inspection to the sewage treatment plant and the water-works filtration plant, pumping station, Lake Waco and the dam. Following this trip, the Water Department staged a barbecue and luncheon in the picnic grove on the shores of the city's greatest asset, Lake Waco—a body of water which has made special reduced sprinkling rates practicable and ample water available for beautification of municipal and private properties, and made Waco the "Oasis of the Prairie" during the drought of 1934. This is the work of Waco's far-sighted and non-political Board of Water Commissioners which is appreciated no less than its capable broad shouldered, likeable Superintendent—George Rohan.

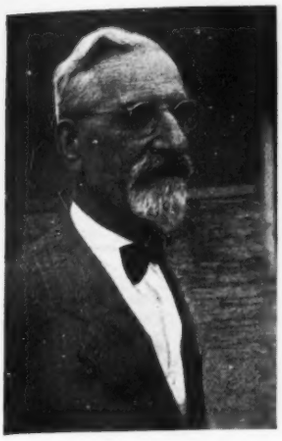
The Convention opened with a dance and closed with a dinner-dance.

At the two luncheons the singing of songs of the Range by Bill McArt of Oklahoma City, who is leading

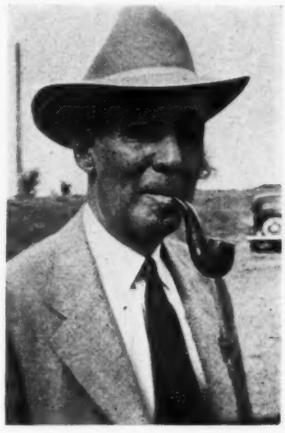
*Originally a village of the Hueco Indians—"Waco" the nearest American pronunciation, became the white man's outpost in 1839. —Editor.

*W. H. Vaughan, Superintendent, Water Works, Fort Smith, Ark. Retiring President.*

*John B. Winder, Superintendent, Water and Sewerage, Dallas, Tex. Incoming President*



*Jesse H. Shaw, Superintendent, Water Works, Tyler, Tex. Past President and Honorary Member.*



*Lewis A. Quigley, Superintendent, Water Works, Fort Worth, Tex. Secretary-Treasurer of the Association.*

a misspent life selling for Pittsburgh-Equitable, was outstanding, as was also the duet work of McArt and Miss Ethyl Sherman.

Aside from being President Elect of the Water Works Manufacturers Assn., and having charge of manufacturers exhibits, Guy Northrop did some high class exhibition work, proving that he is in reality a sleight of hand performer of the first water. In this, Mrs. Egmont Smith and John Winder assisted by serving as his victims.

Only the *Police Gazette* could adequately report the stag "smoker"—while the women-folk went to see "The Little Minister."

## Burt Hodgman's Absence Lamented

Burt Hodgman, who for so many years has had charge of entertainment for the American, the New England and the Southwest Associations, was prevented by recent and serious illness from being present at the Waco meeting. Serving for him was John Warde of New York City. The Association passed a resolution lamenting the fact that Burt Hodgman was ill; wished him a speedy recovery; wired to him a copy of the resolution. All who have known him and his work in behalf of these Associations, will wish "Burt" the same speedy recovery from his serious illness. (Messages may be sent through the offices of the National Water Main Cleaning Co., 50 Church St., New York City—of which he was founder and is now President.—Ed.)

## Technical Sessions

(President—W. H. Vaughan Presiding)

Following customary greetings from the Mayor, President of the Chamber of Commerce, Chairman of the Water Board and other municipal officials, the first technical session was devoted to papers and talks dealing with Waco's Water Works System—past, present and future. Dr. Frank Carney, Professor and Consulting Geologist, described the "Geology of the Waco Area as Related to Water Supply" and the early flowing artesian wells of Waco which caused the town to become known as "The Geyser City." Waco wells, 2500 to 3000 ft. in the Trinity sands, now yie'd water of 107 to 115 degrees F.

Dr. W. T. Gooch, of Baylor University, who is Chemist of the Waco Water Department, reviewed the "Problems of the Waco Supply in Respect to Quality of Water." He said that the first filtration plant, built in 1913 to treat water from the flashy Brozos River, had frequently to handle water containing 50,000 parts of solids, at times taking more water to keep filters washed than was being filtered. Following dry periods the river water would contain gypsum and salt to the extent of 360 parts of calcium; 1300 parts of chloride, 1090 parts of sodium; 907 parts of sulphate. The unsatisfactory ground water and the impossible river water in dry weather was ample reason for the construction of Lake Waco. Chemically the new supply was far superior, requiring uniformly low coagulant dosages, but then came taste and odor troubles and gas forming bacteria requiring 4 to 5 grains of alum for their removal. The woody tastes seemed to be originating from decomposing vegetation in shallow areas rather than from algae or bottom mud. Prechlorination and 7 to 8 ppm powdered carbon to the coagulated water had been the most effective treatment. Aeration and ammoniation had not proved as effective when the ammonia was applied to the raw water.

T. G. Banks said that aeration at Oklahoma City was followed by coagulation with lime and ferrous chloride, made from scrap iron and chlorine, and that certain very difficult tastes had been removed by heavy chlorination followed by sulphur dioxide for dechlorination.

**"Commission Form of Water Department Control and How It Works in Waco"**—Dr. S. R. Spencer, Chairman, Board of Water Commissioners, Waco, Tex.

Dr. Spencer, who is Professor of Physics at Baylor University, said that politics had never given the Water Department any worry in the 30 years since the commission control had been established by a vote of the citizens and one member of the Board—Judge W. J. Sleeper—had served for 19 years. More recently the Board of Commissioners, serving without compensation, had been changed each odd year by the election of two new members and retirement of the two oldest members—the average span of service being six years. The Board was responsible only to the citizens and had no political complexion, employed all water-works personnel which accounted for their long tenure of position. All funds of the Water Department were kept separate, he said, and no force could alter that procedure. On all water bonds the payment of interest and rate of retirement and all purchases by the Department had been kept in the hands of the Commission. Other municipal departments paid for water used and also a hydrant rental was collected—$12,000 for the fire protection service being the most paid in any one year. Efficient management and work of employees had made it possible to reduce water rates to a 75 cent per month minimum

*George J. Rohan, Superintendent, Water Works, Waco, Tex. Elected Vice-President*

*Thos. G. Banks, Superintendent, Water Works and Sewerage, Oklahoma City, Okla. A State Governor.*

charge, with 2000 gals. allowed. Beyond this the rate was 20 cts. per 1000 for 20,000 gals. and thereafter 10 cts. per 1000 gals. During the drought of 1934, consumers had been encouraged to use all water required and special sprinkling rates (20 per cent discount) had been established to the benefit of many. Lake Waco had been a God-send to the community.

In reply to questions, Dr. Spencer said that the present bonded debt against the Water Department properties was $2,400,000, whereas $1,400,000 had beeen retired from surplus income up to date. Bonds had to be voted by the people. The Commission was established by vote of the people and San Antonio had a Commission form of water-works management also. Once established it could not be disturbed without a new charter revision.

A member present lamented the fact that his system had been profit yielding but none of the surplus was allowed last year for making needed improvements. It all went into the General Tax Fund.

**"Pensions for Employees of Municipal Utilities"**—JOHN MCGLASSON, City Attorney, Waco, Tex.

Mr. McGlasson spoke in support of his thought that all municipal employees should be given some form of retirement or disability pension, there being no sound reason for confining pensions to the Fire and Police Departments as at present. He had concluded that municipal pensions would be held legal if continued in the form of a salary and not a gift labeled "a pension." A pension scheme should be patterned on the basis of the existing Workman's Compensation Act, with added thereto an old age retirement benefit. He later would have more information to report on this subject and expected to find it workable if given the proper study. Mr. McGlasson was thereupon invited to appear before the 1935 Convention.

## Second Session

(H. E. NUNN, Van Buren, Ark., Presiding)

**"The Fire Department and Its Relation to the Water Department"**—JOHN WOODY, Chief of Fire Department, Austin, Texas.

In the author's absence, his paper was presented and discussed by A. R. Davis, Supt. Water Works, Austin, Texas. Mr. Woody pointed out that in grading Texas cities for fire insurance rates the weight given water supply was 50 per cent, whereas but 30 per cent was allowed for fire fighting facilities. In Austin the firemen were required to study maps showing the 1,200 hydrant locations and diameter of main to each and upon examination, 90 per cent of the men had passed with a perfect score. In co-operation with the water department an annual inspection of hydrants was made, conditions being reported to the Superintendent of Water.

*Henry E. Nunn, Superintendent, Water Works, Van Buren, Ark. A State Governor.*

*A. R. Davis, Superintendent, Water Works, Austin, Tex. A State Governor.*

Mr. Woody stressed the value of hydrants sufficiently closely spaced to avoid long hose lines and the literal use of cut-off valves; also the importance of notifying the Fire Department of shut downs or reduced pressures on the system. Municipalities of less than 70,000 population had to carry an added investment in main sizes to give adequate fire supply, whereas, in larger cities the diameter of mains required for domestic supply were ample for fire service also.

A. R. DAVIS, Supt. Water Works, Austin, Tex., recommended consulting the Chief of Fire Department when planning extension work in order to best ascertain where improvements were most needed. He also said that the good will of the Fire Department was a decided asset in promoting general good will of the public toward the Water Department.

A. F. DANIEL, Water Dept., Dallas, Texas, said that as the result of a Pitometer survey the Dallas Water Dept. had completed plans for improvements over the next 20 years which would require an expenditure of $1,000,000 principally to provide increased fire protection. At present an elevated tank of 1 M.G. capacity was being installed as a PWA project.

**"The Water System as the First Line of Defense in Fire Fighting"** — H. P. BOHMAN, Supt. Water Works, Milwaukee, Wis.

Mr. Bohman's paper, read by E. A. Fowler of New Orleans, offered valuable recommendations for improving the fire protection facilities of water supply systems. The use of the grid-iron distribution with tie in of mains at 600 ft. intervals or less, 500 ft. spacing of gate valves,

*Left: F. D. Teaffee, Ida Bell, Okla., and B. C. Moss, Chickasha, Okla.,*

*Center: C. H. Smith, Charlie Barry, H. E. Nunn Look Over the Photo of the 1916 Waco Convention. Barry Has Attended Every (23) Convention of the S. W. Association.*

*Right: F. M. Vertch, Construction Engineer, Kansas City, and "Doc" A. H. Douglas, City Manager, Wichita Falls, Tex.*

*J. W. Everett, Manager, Water Works, Springfield, Mo. A State Governor.*

*R. H. Brooks, Superintendent, Water Works, Ruston, La. A State Governor.*

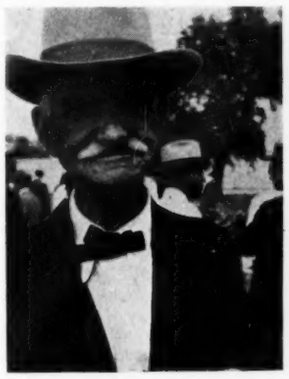
use of recording pressure gages at strategic points on the distribution system and effective location of hydrants, were among these. Further, the importance of adequate valve and hydrant inspection and maintenance could not be over-emphasized. He said, that high pressures carried on mains were no longer an important factor with modern fire pumpers, but that a two main system possessed decided advantages as did the proper distribution of storage by elevated tanks or in ground tanks with automatic booster pumps connected to provide adequate pressure during peak load on the system, such as have been installed on the high and low service at Milwaukee. Mr. Bohman listed other improvements made to fortify the Milwaukee system and stressed the importance of adequate protection of private properties by overhead sprinkler systems. He commented on the far greater fire losses per capita in America then in European cities (about $2.30 as compared with 64 cents), which he believed due to less congestion and greater respect for fire abroad.

**"Tracing Underground Flows—Special Reference to Pollution"** — F. M. VEATCH, Black & Veatch, Engrs., Kansas City, Mo.

Mr. Veatch referred to statistical evidence which revealed the lack of dependability of well water supplies as safe supplies. In recent years the number of cases of water borne disease had been about eight from untreated well supplies to one from treated surface supplies; indicating that too much confidence had been placed in supposedly safe well supplies. Studying the records of ground water supplies in Kansas, covering periods of 8 years, only 2 per cent had had perfect records. He listed the sources of hidden pollution and gave case records illustrated by lantern slides. It was his conclusion that well water supplies must all be protected by sterilization treatment to proved insurance of their continued safety. He recommended routine testing of ground water supplies to detect any change in quality, by applying simple bacterial and chemical tests such as chloride and alkalinity.

Mr. Veatch outlined four methods of tracing pollution travel underground—the geophysical, chemical, electrolytic and dye tests. The last named, he said, had been the most commonly employed method and had proven effective in tracing cross-connections and sewer connections. For the detailed method and application he recommended U. S. Govt. Survey Paper 638-C, procurable from the Geological Survey Office at Washington, D. C.

J. B. DANNENBAUM, Engineer in Charge of Water Supply, Houston, Texas, said that Houston had been

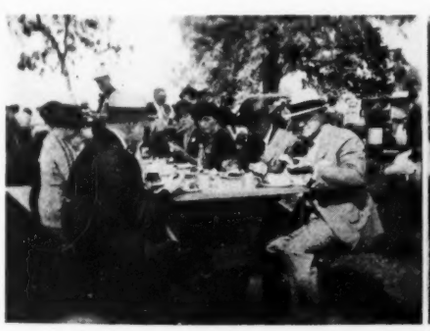


*Judge Wm. Sleeper. Served 19 Years on Waco's Water Board.*

*Dr. S. P. Spencer, Chairman, Water Board, Waco.*

forced to resort to searching out and correcting possible sources of pollution of its numerous wells. Sealing of abandoned wells and other measures had been taken and more recently they had adopted the ammonia-chlorine sterilization process on all wells. He concurred in Mr. Veatch's opinion that sterilization of well supplies was a needed precaution and justified expense. In addition, no less than 40 daily bacterial analyses of the water at various points on the system were being made and private wells in the city were also being checked at intervals.

L. H. ENSLOW commented on the very interesting and thorough methods followed by the Water Department of



**At the Barbecue**

*Left: "Buk" Little, and Kahns Say the Southwest Knows How.*

*Center: The "Bread Line" in Action.*

*Right: Guy Northrup and John Warde with Talent Picked by This Entertainment Committee.*

Houston in perfecting its chlorination program. To procure rapid sterilization the chlorine was being applied ahead of the ammonia—the reverse of the normal procedure. The ammonia was then added only in quantity sufficient to render the residual chlorine tasteless and to procure the persistent chloramines which traveled far out into the system to maintain sterile conditions and preclude taste production by decomposition in the mains proper. He considered that when a water contained no foreign substances to form taste producing compounds after chlorine addition the Houston scheme had many advantages, including economy in the consumption of ammonia. To Messrs. Dannenbaum and Harvill credit was due for the first adoption of the novel reverse scheme of the ammonia-chlorine process on a large scale and it would without doubt be of considerable interest to many others in future programs of well supply protection, because of its several advantages.

*J. B. Donnebaum, Water Engineer, Houston, Tex.*

*C. M. McCord, Engineer and General Superintendent, Water Department, Memphis, Tenn.*

*L. R. Burrow, City Manager, Spurr, Tex.*

*Maj. John B. Hawley, Construction Engineer, Fort Worth, Tex.*

## Third Session

(T. G. BANKS, Presiding)

**"The Water Supply of Paris, France"** — MAJOR JOHN B. HAWLEY, Consulting Engineer, Fort Worth, Texas.

The Major in his customary style reviewed in a most interesting manner the historical developments of the water supply of Paris and then described the system as of today. He pointed out that the early aqueducts had been built in 1605, during the reign of Marie de Medici, to bring to Paris a soft and pure water. In 1810 Napoleon had commissioned a young engineer (30 years old) named Gerard to build additional supply canals and conduits from the mountains. It was at this time that a less pure water was supplied through the first known dual system of piping for use in flushing and by industry; and, this system remains in use at present to a considerable extent. Another notable character in the waterworks history of Paris was Eugene Belgrand, who served for 40 years as Supt. of Water and Sewerage and as Hydraulic Engineer. He had fought many battles against political domination and interference, developed many new innovations in Hydraulic Engineering and dropped dead at his desk after 60 years of service. His writings and reports were masterpieces of conception and execution.

Major Hawley described the slow-sand filtration plant, located on the River Marne 9 miles from Paris, which made use of well points driven in the beds for washing the filters. Another filtration plant (gravity type) was located on the Seine River and had filter beds of about half the depth of the American filters. He referred to the "political process" of chlorination at Paris which was developed by Buneau Varilla and based apparently on homeopathic theory that the weaker the hypochlorite solution employed the more powerful the effects. The Buneau Varilla system, the Major said, was mostly "on the wall" however and chlorination, involving the use of liquid chlorine as in America, was practiced in fact but was kept hidden in a closet. The quality of filtered water was about that of the supply of Fort Worth or Dallas—being slightly hard. The consumption averaged 100 gals. per capita per day supplied through a 100 per cent metered system, employing an excellent design of meter. Rates were 26 cents per 1000 gals. and downward—about the same as the rates of Dallas or Ft. Worth and collec-

*Left: Hardcastle and Steindort, Chain Belt Co.*

*Center: Puckhaber and Schouten, Wallace and Tiernon's Cowboys.*

*Right: John Winder (Dallas) and H. B. McAllister, Construction Engineer, Waco, Tex.*

*Lake Waco Dam—With One Flood Gate on the Spillway Raised.*

tions were made quarterly only. Pressures of only 30 to 40 lbs. were maintained on the distribution system and fire hydrants were located out of view beneath the sidewalks.

Major Hawley commented on the excellence of the concrete work in France, a result of the use of about twice the quantity of cement as is used in American concrete. There was, however, a decided disinclination to adopt new devices or processes in water purification practice and distribution and consequently antiquated practices were being followed in the Parisian water works operations in a large measure.

**"The Consulting Engineer on PWA Projects"**—Joseph J. Rady, Consulting Engineer, Fort Worth, Tex.

Mr. Rady said that PWA projects approved in Texas amounted to 300 with $69,000,000 allocated. So far, however, only $2,000,000 had been made available on 30 projects. He considered it the duty of the Consulting Engineer to discourage unsound projects. The major difficulties in getting projects approved was the question as to the legality of bonds of a utility nature when issued by municipalities and courts had taken many months in reaching decisions. So far the meticulous care taken to prevent deviations from PWA rules had been unjustifiably costly and delaying. Mr. Rady felt that public works in the future might well be financed on a loan from the Federal Government from a revolving fund provided to bear low rates of interest and long terms of repayment. The offering of grants should be abolished in order to preclude too much governmental control at too great expense.

**"Practical Methods of Installing Battery Meters"**

*Clyde Hawill, Sanitary Engineer, Water Department, Houston, Tex.*

*W. S. Mahlie, Superintendent, Filtration and Sewage Treatment, Fort Worth, Tex.*

—C. M. McCord, Gen. Supt. Water Works, Memphis, Tenn.

Mr. McCord explained that he had come into the water-works field only recently from the field of electrical engineering. He therefore felt some misgivings in presenting his thoughts before a body of water-works men of long experience. He then described and exhibited an improved type of locking meter box top developed by him to prevent stealing of water or tampering with the meter. In Memphis there were 25,000 meter boxes equipped with some type of locking device. Mr. McCord also exhibited a special locking key for preventing the opening of the service shutoff cock.

To prove to complaining consumers that meters had actually been read he proposed to install a system involving a punch card which would be properly punched by the reader to show date, reading, etc., and left in the meter box at each reading. Further, he was considering the scheme of fitting out a special truck for use in demonstrating accuracy of meters by making field tests at a moderate charge of 50 cents as against the present $2.00 charge for making shop tests. He felt that such a service offered before the consumers' eyes would be an excellent means of building up good will; and, when not answering calls, the truck could be utilized in routine testing in the field or shop.

*M. H. Collins, Rensselaer Valve Co., Louisville, Ky. A Director of the S. W. W. A. Journal and Hard Worker for the Association*

*Egmont Smith, Neptune Meter Co., Dallas, Tex. Has done much for the Association; is a Journal Director.*

Mr. McCord reported on a study made in Memphis to evaluate the accuracy and dependability of battery meter installations vs. compound and turbine type meters. He presented his experiences in making up a battery meter installation and in his illustrated talk described the special design of a cast-iron manifold joining the meters and connections which seemed best suited for the conditions. In tests, the battery of three 2-in. meters at flows above 5 gals./min. gave extremely accurate readings through the several increases to 685 gals./min. The compound meter was more accurate at flows of less than 10 gals./min. but upon increasing that rate this type meter lost accuracy and at the changeover point was only 75.5 percent accurate, whereas the battery meters and the turbine type meters were 99.7 and 98.1 percent accurate at that flow of 22.5 g.p.m. Between 68 and 680 g.p.m. all three types of meters gave 99 percent accuracy or higher, the turbine type being surprisingly accurate. At very low flows most if not all of the water passed through the least resistant of the three meters comprising

the battery but even so the compound meter was the most accurate. As to head lost—the meter battery at 350 g.p.m. flow registered a 15 lb. loss whereas the drop through the compound meter was but 8.75 lbs. and the turbine meter registered the very low 6 ft. loss. The conclusion reached was that meters in batteries were satisfactory when a pressure drop of 10 to 15 lbs. was not important—otherwise a compound or turbine type meter should be selected on the basis of requirements to be met.

A. R. DAVIS, Supt. Water Works, Austin, Texas, said that their practice in case of a shutoff of water service was to remove the meter and plug the line with Leadite. Having made a study of the locking type of meter box, it was found that meters reported as tampered with had been constantly on the down grade during the 10 years of the increasing number of locked meter boxes installed.

J. B. WINDER, Supt. Water, Dallas, Texas, felt that the locking type of meter boxes were not desirable. To stop tampering with meters all cases reported to the police in Dallas had been promptly handled by making an arrest.

*P. I. Deaver, Superintendent, Water, Broken Bow, Okla.*

*C. E. Tweedle, Engineer, International Filter Co., Houston, Tex.*

## Fourth Session

(President Elect, JOHN B. WINDER, Presiding)

**"Sprinkling Rules and Regulations"**—E. G. PLOWMAN, Exec. Asst. Water Board, Denver, Colo.

Mr. Plowman cited methods commonly employed to regulate lawn sprinkling and thereby reduction of loadings on water works systems. In addition to enforcing of rules and regulations, an appeal to the public's sense of justice and spirit of conservation was always an important and fruitful help. In Denver the regulations specified 3 hours' limit on sprinkling for each residence each day. One side of the street is notified by card to sprinkle only in the afternoons on alternate days and in the mornings on days between. The opposite side of the street receives instructions to sprinkle during the morning when the other is being allowed to sprinkle in the afternoon and the reverse on alternate days. Newspaper advertisements appear weekly to appeal for adherence to regulations and radio talks of appeal are broadcast—10 such talks in 3 days having reduced consumption by 10 percent. Regulations pertaining to sprinkling and the hours of sprinkling allowed are enforced by automobile inspection—in 1934 6,000 being reported as violators. The cost of sprinkling supervision

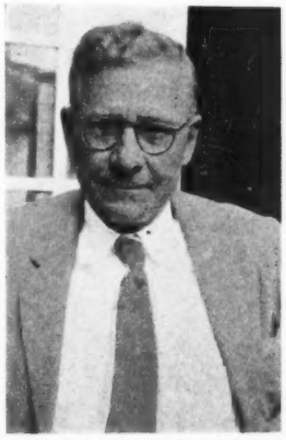
*Getting Set for the Picture at the Barbecue—Lake Waco.*

in Denver varies from $900 to $1,100 per month, the average being $800 and totalling $4,000 for the five-month period. The sprinkling load is estimated to be 200 gals. per capita per day.

Experiences elsewhere show that meter rates, unless very high, do not deter sprinkling. Salt Lake City is 100 percent metered but it is necessary to limit sprinkling to 3 hours daily to reduce consumption by 10 percent. Colorado Springs, Colo., allows but 1 hour sprinkling daily—resulting in a 25 percent saving. Other cities require that sprinkling be done only by hand holding the hose and thus reducing sprinkling waste. On the other hand, El Paso, Waco and San Antonio encourage sprinkling by offering reduced rates or else an increased volume of water at the same price. Advertising the availability of water at 6c per ton, as has been done in Texas, should be sufficient to encourage increased usage where the supply and distribution facilities were adequate. San Antonio, he said, had put into effect 10 rate reductions since 1925, but the gross annual income had not fallen off.

**"Control of Tastes and Odors in Water Supplies"**—O. J. RIPPLE, Supt. of Filtration, Denver, Colo.

Mr. Ripple's paper, presented by Clyde Harvill of Houston, constituted a valuable review of accomplishments in taste and odor control procedure. Heavy prechlorination and carbon application seemed to be the most positive method of removing tastes, whereas the applica-



*"Ed." A. Fowler, New Orleans, La. A Past President.*

*Pat. Brachen, Baytown, Tex. First President of the Association—1912.*

tion of ammonia and chlorine to carry a residual into the system had been effective in correcting prevalent dead end trouble, including tastes. He felt that the added cost of $1.00 to $2.00 per million for taste correction was amply justified. An example of heavy prechlorination to remove tastes and odors was cited, aeration alone reducing an odor of 200 to 100, whereas chlorination had reduced the residual 100 to 8.

At Denver tastes and odors came from algae mostly and copper sulphate was used as a preventative. Powdered carbon mixed with the lime was added continuously to the raw water to stabilize sludge. When necessary to combat incoming tastes additional carbon (.2—.3 gr./gal.) was applied. The latter treatment not being continuous, tastes sometimes got past the plant but ammonia and chlorine applied to the effluent had been continuous and helpful. He reiterated that the matter of primary importance was effective taste correction or prevention and that secondary consideration only being given to the added expense.

C. E. TWEEDLE, International Filter Co., Houston, Texas, related a recent experience wherein a Texas municipality had drilled a well only to find that the water was not satisfactory because of taste and odor. A more costly source was resorted to until a pressure filter containing granular carbon could be inserted in the main from the new well. A sand filter protecting unit ahead of the carbon unit had been effectively removing tastes and odors for five months at a rate of 3 gals. per sq. ft. per minute. The complete installation had cost $6,000, but had paid for itself due to the reduced cost of pumping the new but previously objectionable supply.

**"Work of the A. W. W. A. Committtee on Methods of Analyses and Specifications for Water Purification Chemicals"**—W. S. MAHLIE, City Chemist, Fort Worth, Texas.

Mr. Mahlie presented a report outlining the progress being made by the above Committee under the Chairmanship of Matthew W. Braidech of Cleveland. The work of this Committee has constituted a large and much needed undertaking which will yield standardized and the most appropriate methods for analyzing the numerous chemicals and for evaluating activated carbons offered for water purification. The Committee has been working hard to hasten completion of its undertaking.

The Business Meeting, covered earlier in this report, closed the 23rd Convention of the Southwest Water Works Association.

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## Activated Sludge Patent Covering "Spiral Flow" Held Invalid

### Chicago Held to Infringe Five Others

The United States Supreme Court has sustained the opinion of the lower courts and the Court of Appeals, which held that the city of Milwaukee has infringed patents covering the Activated Sludge process which are held by Activated Sludge, Inc. Milwaukee appealed for a review of the earlier decisions on the grounds that H. W. Clark at the Lawrence, Mass., Sewage Experiment Station, and H. P. Eddy at the Worcester, Mass., Sewage Treatment Works were the rightful inventors of the Activated Sludge Process which was perfected and patented later in England.

Suits were also filed against the Chicago Sanitary District for violation of the Activated Sludge patents and claims of infringement have been upheld by the District Court, from which Judge W. C. Lindley handed down a decision the latter part of October, after the Supreme Court decision on the Milwaukee case had been rendered. Six patents were involved in the Chicago case—four being those which were upheld in the Milwaukee case and a fifth was very similar to the other four. On these Chicago was held to have infringed.

As to the sixth, and highly important patent [No. 1,341,561], covering the use of the spiral-flow feature, so extensively used in modern activated sludge plants employing air blowing or paddles, Judge Lindley held that one to be invalid on the grounds that it covers only "the exercise of mechanical skill in adapting a structure to such form as will best promote general and complete circulation with the least possible friction."

The District Court held that although the five patents were being infringed by Chicago, an injunction was refused on the grounds that to stop operations would create a health hazard and probable damage.

Reports from Activated Sludge, Inc., of Chicago indicate that 38 American cities have paid for licenses to use the process—a fee of 25 cents per capita served by the treatment works—and 52 have applied for license.

▼

## Wynkoop Kiersted

Wynkoop Kiersted, a veteran Hydraulic Engineer, who became well known for his work in water supply and sewerage projects, died on November 6th at his home in Liberty, Mo. He was 77 years old and for many years practiced consulting work with offices in Kansas City, Mo. He ranked amongst the foremost engineers in his chosen field and retired only a few years prior to his death.

Mr. Kiersted was born in Mongaup Valley, N. Y., in 1857; was graduated by Rensselaer Polytechnic Institute in 1880 and went west to seek his fortune as a cub Civil Engineer. He established an office in Omaha, Neb., which he moved to Kansas City, Mo., in 1887. He served as Chief Engineer during construction of the Galveston, Tex., water works from 1892 to 1894, returning to become associated with the Kansas City water system and several private companies, during which time he introduced many improvements, including clarification of turbid waters by coagulation. He also designed the sewerage system of Kansas City. His next important work was that of evaluation of the Los Angeles, Oakland, Calif., and other water works properties.

During the World War Mr. Kiersted served as Supervising Engineer of Cantonments, became Division Engineer of the U. S. Housing Corp., and a member of the Engineering Board of Review for the Chicago Sanitary District. Possibly the last projects he designed and supervised were those of water supply and sewage treatment for Amarillo, Tex. He was the author of a book on "Sewage Disposal" and co-author of "The Management and Maintenance of Water Works Systems," published by John Wiley & Sons. He was a member of the American Society of Civil Engineers and American Society of Mechanical Engineers.

He is survived by a widow, two daughters and his son, Wynkoop Kiersted, Jr., of New York City, at one time a partner of his illustrious father, who had pioneered in water works and sewerage and established a reputation during his connection with more than fifty systems.

# PORTABLE GRIT CHAMBER FACILITATES SEWER CLEANING

By CHAS. C. AGAR*

SAND entering sewerage system is always a problem, particularly in a system not designed to handle such material.

A grit chamber at the treatment plant is frequently necessary in order to prevent deposition and clogging in channels, hoppers, and sludge lines. It also serves to prevent unnecessary wear on pumps and other mechanical equipment. But when sand accumulates in sewers to such an extent that clogging is frequent, the problem becomes serious, especially when a despairing superintendent cannot predict where or when the next stoppage will develop. And this was the problem which confronted the new superintendent of the Delmar-Elsmere Sewer District when he assumed his duties.

The Delmar-Elsmere Sewer District comprises a relatively flat area of 2.8 square miles about 200 feet above sea level and located southwest of the city of Albany.

The estimated population of the district is 4,500, although only about 2,500 at present are connected to the sewer system, which contains approximately 16 miles of sewers, ranging in size from 8 to 21 inches in diameter. The system, designed to avoid pumping as far as possible, contains sections laid at depths of 15 feet or more. A clay strata overlain with sand results in a high ground water table throughout the district.

During construction of the system in 1929 a large amount of ground water and quicksand was encountered. Therefore, much of the shoring was left in place and cradling of the pipe was resorted to at several points. In spite of the precautions taken, it was not long before breaks occurred, each break carrying in a large amount of very fine sand which was difficult to remove by conventional methods. Flushing and the use of "snakes" and cleaning rod equipment was not satisfactory, serving only to transfer the problem to some other point in the system.

Trouble from sand has continued, and when the new superintendent took charge of the system various improvised implements were tried.

Consideration was also given to the installation of several sand traps or grit chambers in the system, but as this scheme involved considerable expense it was decided to experiment with the adaptation of a portable grit chamber. The usual location of a grit chamber is just ahead of the treatment plant, but, reasoned this enterprising superintendent, "if Mahomet will not go to the mountain, the mountain must come to Mahomet."

*Assistant Engr., State Department of Health, Albany, N. Y.

*Fig. 2—Portable Grit Chamber in Use. Pile of Sand Removed in Foreground.*

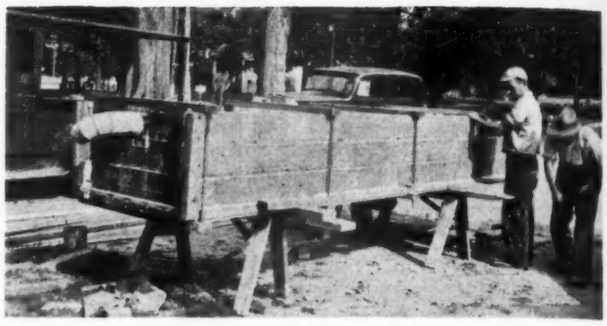


*Fig. 1—Portable Grit Chamber Under Construction. Mounted on Skids and Taken from Manhole to Manhole During Use.*

## Developing a Portable Separator

A wooden tank of about 75 gallons capacity was constructed to serve as a portable grit chamber. This was set up at a manhole and sand and sewage pumped through the tank, the effluent returning to the sewer on the downstream side of a temporary stop-plank placed in the same manhole. The line between the manhole and the next above was then "dragged" to bring the sand into position for lifting with sewage to the portable grit chamber above.

After demonstrating the feasibility of such a method a larger tank was constructed (Fig. 1). This tank consists of a waterproofed wooden box 3 by 14 feet in plan, with an effective depth of 18 inches. The tank is mounted on skids so that it may be transported readily. Baffles consisting of metal plates are placed at the inlet and outlet ends of the tank.

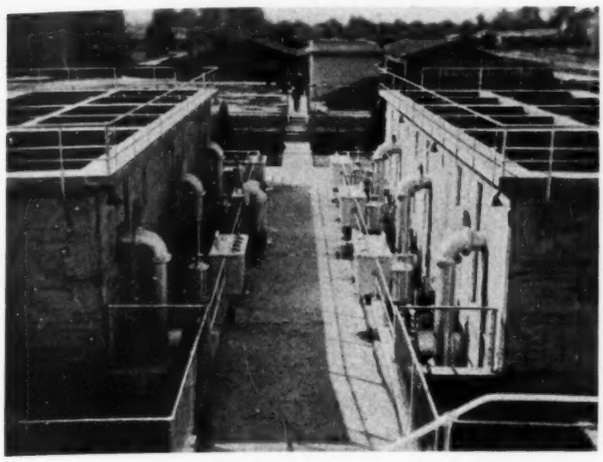
A gasoline driven diaphragm pump lifts the sewage into the tank (Fig. 2) and during the 15-minute detention period provided, effective removal of the sand results before return of the settled sewage to the sewer. The sand removed by shovels is treated with chloride of lime and stored temporarily on the ground. The material removed, which appears in the foreground of the accompanying illustration, is surprisingly free from organic matter and after drying is comparatively light in color.

During the past summer 20 cubic yards of sand have been removed in this manner from 2100 feet of 12, 15 and 18 inch sewers and it is planned to continue the work next year.

The cost of the tank complete was $75.00, and about $50.00 was spent for rope, pulleys, and miscellaneous equipment. The pump, which was already available, is a standard portable gasoline engine driven diaphragm pump, having a capacity of 20 to 25 gallons per minute.

The daily cost of operation averaged about $35.00, including the services of four men and a charge of $8.00 per day for the use of horses to operate the drag line. So heavy were the sand deposits that three days were normally required to set up the equipment and clean a section of sewer 300 to 350 feet in length.

This method of handling a difficult problem in sewer maintenance is unique and illustrates the ingenuity of a superintendent of a small system, having only limited facilities available.



*The Open Filters at the Wilmington Plant of the Los Angeles Water Supply System*

# CALIFORNIA SECTION, A. W. W. A. HOLDS RECORD CONVENTION

THE California Section of the A. W. W. A. held its 15th—and record breaking—Annual Convention on October 24-27 at Long Beach, California.

Not less than 50 manufacturers exhibited and 830 members and guests registered—almost double that of the 1933 convention and considerably exceeding the next largest, which was the Pasadena convention of 1930.

No finer arrangement of exhibits of materials and equipment was ever staged at any Water Works Convention, including the National. Nor was there more interest shown by members in the exhibits as well as in the technical sessions. To Jim R. Barker, Western Manager, Neptune Meter Co., goes the credit for exhibit arrangements, extraordinary.

Entertainment, in charge of R. W. Martindale, U. S. Pipe and Foundry Co., was of West Coast quality—that is to say, was outstanding. The convention opened with a day of golf; closed with a dinner-dance and floor show of which "Broadway" boasts none superior. Local arrangements, under the direction of Fred S. Porter, Manager, Long Beach Water Dept., ranked with the best. A trip of inspection over the Long Beach Water Works system and to the novel filtration plant of the Los Angeles Water Department, located in the Wilmington area nearby, completed the program.

*N. A. Eckart, G. M., San Francisco Water Department, Retiring President Went Home to Receive the New Hetch-Hetchy Supply (See Story in This Issue).*

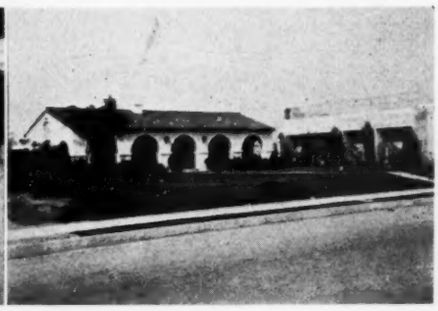
*H. A. Van Norman, G. M., Los Angeles Water Dept., New President of the Section.*

## Purification Dinner and Play

The convention opened with the annual dinner of the Water Purification Division, R. F. Goudey officiating as toastmaster. The attendance at the dinner broke previous records by 100 and there was an overflow into another room. Entertainment included a three act farce, staged in the office of a small town Water Works Super-

*A Glimpse of the Pacific at Sunset-Time as Viewed from the Convention Hall.*

*George Pracy Tells Jane Rider of Tucson, Ariz., Something That Was Far Less Dry Than the Desert.*



*The Los Angeles Filter Plant Supplying the Wilmington Area, Which Adjoins Long Beach.*

## At Long Beach

*Fred S. Porter, G. M., Long Beach Water Dept., Host to the Convention.*

*J. E. Phillips, Los Angeles Water Dept. The "Go-Getting" Secretary of the Calif. Section.*

intendent, which was written and produced by Miss Jane H. Rider of Tucson, Arizona, and A. M. Rawn of Los Angeles. Mrs. Fred S. Porter's vocal selections and the renditions by a quartet from the Los Angeles Dept. of Water Supply, were those offerings of which there can never be enough.

## Business and New Officers

Of the 320 members in the Section, 75 are officials and employes of the Los Angeles Dept. of Water Supply—Hats off to "Bill" Hurlbut, Chairman of the Membership Committee.

*Officers for* 1934-1935:

President, H. A. Van Norman, Los Angeles.
Vice-President, R. F. Brown, Stockton.
Secretary-Treasurer, J. E. Phillips, Los Angeles.

*Water Purification Division:*

Chairman, Ray L. Derby, Los Angeles.
Vice-Chairman, G. E. Arnold, San Francisco.
Secretary, C. M. Hoskinson, Sacramento.

*The Program*

"Weed Growth Control on Reservoir Banks"—G. E. Arnold, Water Department, San Francisco.

"Design of Chlorinating Plants (Illustrated)"—S. M. Dunn, Department of Water Supply, Los Angeles.

"Emergency Treatment of Water Following Catastrophes"—R. F. Goudey, Dept. of Water Supply, Los Angeles.

"Experiences with Fluorine in Water"—Jane H. Rider, State Dept. of Health, Tucson, Arizona.

"Corrosion by Zeolitic Zero Softened Water"—R. L. Derby, Dept. of Water Supply, Los Angeles.

*S. B. Morris, Pasadena, Calif., Has a Dam Named in His Honor.*

*Ray F. Goudey, Los Angeles, Calif., Past-President of the Section; Toastmaster,* 1934.

"Operating Experiences at the Wilmington Filter Plant"—R. O. Van Meter, Dept. of Water Supply, Los Angeles.

"Ferric Chloride Treatment of Water"—Prof. Chas. Gilman Hyde, University of California, Berkeley.

"The Long Beach Water System"—Fred S. Porter, Manager, Water Department, Long Beach.

"Disaster Preparedness"—Burt Harmon, Engineer, Water Dept., Long Beach, California.

"Life of Water Works Structures"—Geo. A. Elliott, Construction Engineer, San Francisco.

"State Supervision of Dams"—Geo. W. Hawley, State Engineer in Charge of Dams, Sacramento.

"California Type of Wells"—J. A. Wade, Chief Engineer, California Water Service Co., San Francisco.

"Gravel Envelope Type of Wells"—C. R. Browning, San Joaquin Rancho, Tustin.

"Industrial Pollution of Underground Waters"—W. M. Brown, Water Department, Long Beach.

"Delinquent Accounts"—Chas. L. Thatcher, Manager, East Bay Municipal Utility District, Oakland.

"Public Relations"—M. R. MacKall, California State Railroad Commission, San Francisco.

"Purchasing for Water Works"—D. P. Nicklin, Dept. of Water Supply, Los Angeles.

*"Ken" Brown, Stockton, Calif., Chairman, Water Purification Division.*

"Legal Phases of Water Supply"—W. G. Irving, Attorney-at-Law, Riverside.

"Hydrographic Surveys for Water Supply"—J. E. Jones and Geo. A. Lewis, Dept. of Water Supply, Los Angeles.

"Water Supply for Construction Camps"—C. C. Elder, Southern California - Metropolitan Water District, Los Angeles.

"Practice in Replacement of Meters"—Chas. L. Ruckman, Asst. Supt., Dept. Water Supply, Los Angeles.

"Coast Range Tunnels, Hetch Hetchy Water Supply"—L. W. Stocker, Chief Engineer, Hetch Hetchy Project, San Francisco.

"Pasadena-San Gabriel Project"—S. B. Morris, Chief Engineer, Water Department, Pasadena.

"Bouquet Canyon Reservoir and Pipe Line"—C. E. Angilly, Engineer of Design, Department of Water Supply, Los Angeles.

gineer of Design, Department of Water Supply, Los Angeles.

"Aims and Achievements of the A. W. W. A."—Geo. W. Pracy, Superintendent of Water Department, San Francisco.

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## Dr. Mohlman Receives First Award by C.S.S.W.A.

At the recent meeting of the Central States Sewage Works Assn., Dr. F. W. Mohlman, Chief Chemist, Chicago Sanitary District, was voted the first award offered by the Association to the author of the most meritorious paper presented before it during the year previous. The award was established in 1933 and represents a monetary prize which will be available annually in the form of interest from a U. S. Government bond held by the Association. Dr. Mohlman's paper was presented at the joint meeting of the Central States Assn. and the Engineering Section of the A. P. H. A. It dealt with recent developments in sewage treatment by chemical precipitation processes; described and evaluated the several modernized methods, impartially and effectively.

Officers elected by the Association for the year 1933-34 were:

Pres.—Dr. M. Starr Nichols, Madison, Wis.
V. Pres.—O. M. Leonard, Frankfort, Ind.
V. Pres.—H. E. Babbitt, Urbana, Ill.
Secy.-Treas.—Gus. H. Radebaugh, Urbana, Ill.
Board of Control—Robert Cramer and H. F. Ferguson.

*36-in. Reinforced Concrete Pipe—Fabricated by Local Labor, Creating 200 Jobs in Green Bay Last Winter.*

# MODERN SEWERAGE CONSTRUCTION IN GREEN BAY METROPOLITAN SEWERAGE DISTRICT

By JERRY DONOHUE,* C. E.

THE Green Bay Metropolitan Sewerage District has undertaken the solution of a sanitary problem which involves the building of a modern sewage disposal plant, combined with a pump station, a complete system of intercepting sewers, control stations, and a main tunnel outlet sewer. The system has been designed for the predicted 1970 population, with an allowance of 500 gallons per day and with sewers computed as flowing half full.

*The Author*

The work is being carried out under a PWA contract and is one of the first large government contracts to be entered into in the Middle West.

The City of Green Bay, located at the mouth of the Fox River, is destined to be one of the great cities of the Middle West. Its geographical location at the head of a rich agricultural valley, and at the outlet of a great industrial area gives to the city a certainty of future development.

A review of the history of the development of this District, with a brief description of the works under construction, and a few general fundamentals of sewage disposal design may be of interest to other cities where similar problems are involved.

When Nicolet landed at Green Bay three hundred years ago, the first white man to enter the great Northwest, the waters of the Fox and East Rivers came to the Bay undefiled by human and industrial waste. For two and one-half centuries after Nicolet came there was no problem of stream pollution. Now, however, the extensive development of the past fifty years in the Fox River Valley has thrown a burden upon the river, and a responsibility upon the City of Green Bay that is being met with the building of sewage treatment works that will ultimately restore the waters of the stream to their original purity.

*President, Jerry Donohue Engineering Co., Sheboygan, Mich.

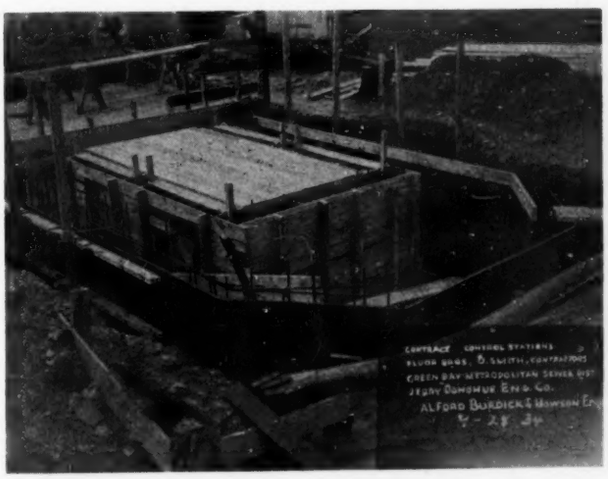
## Studies Begun in 1930

The City of Green Bay employed the author's firm of engineers in 1930 to make a study of the local requirements for sewage treatment and to recommend the most practical means of remedying the pollution of the Fox River and the East River. Studies made indicated that the pollution nuisance at Green Bay might be subdivided into two major classifications:

First, the nuisance resulting from the pollution originating within Green Bay and its immediate tributary area.

Second, the pollution originating outside of Green Bay by other riparian land owners upstream on the Fox River.

The correction of the East River pollution was undertaken first as the discharge of a local responsibility. The solution of the Fox River pollution will be undertaken just as soon as the people of the district agree that the methods employed in the East River District can be successfully extended to include the Fox River and as soon as the necessary appropriation to continue the construction program is approved by them. The engineers concurred in the recommendation of the State Board of



*Foundation Work of One of the 12 Flow-Control Stations on Interceptors. Float Operated Gates Will By-Pass Heavy Storm Flows to Relieve the System. The Superstructures Will Be Neat Brick Housing.*

Health that a metropolitan district be created—because of the fact that since other municipalities are involved, this scheme would make the solution more positive if a Commission was created to look after the interests of the several municipalities in the program to restore the river to a pure water stream.

## Green Bay Sewerage District Established

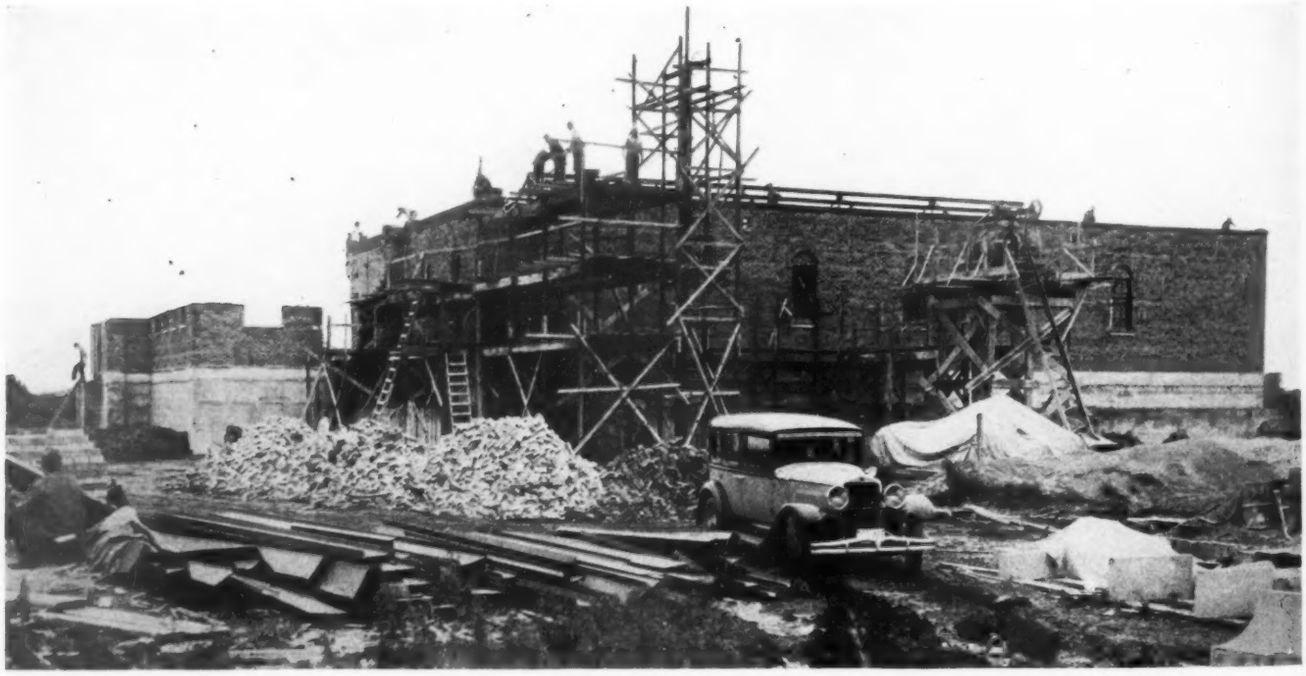
The Green Bay Metropolitan Sewerage District includes all of the City of Green Bay and occupies a low lying plane, practically level in the main section but rising to the west, south and east to an elevation of fifty feet above bay level. The Fox River Valley having been extensively developed by industries, requires large quantities of water with relative constant flows. Lake Winnebago on the Fox River is 160 feet above Green Bay so that cheap water power is available. These natural resources have resulted in the extensive development of paper mill industries in the Fox River Valley. The industrial wastes discharged from paper mills and pulp wood industries have a very high oxygen demand. The actual population of the cities tributary to Fox River between Lake Winnebago and Green Bay is less than 100,000, but the industries have created an organic load which combined with municipal wastes is equivalent to a population of over 800,000 people. In Green Bay proper there are three large paper mills and one sulphite wood pulp mill, the largest in the country.

The East River drains approximately 150 square miles to the south and east of Green Bay. This stream, having no artificial storage and a relatively small drainage area, goes practically dry during the summer months. The mouth of the East River is less than a mile from where the Fox discharges into the Bay and, having been dredged upstream for two and a half miles, during periods of normal run-off the flow is sluggish and the heavier solids are deposited in the river bed. The sludge deposits decompose and gasify during the warm season to create an almost unbearable odor on the entire east side. Forty-five percent of the population at Green Bay contributes sewage to the East River which receives industrial wastes from a paper mill, a cheese works and a brewery in addition. The pollution of the waters in Green Bay has depreciated the value of the property, has destroyed the splendid bathing beaches and reduced the fishing industry to an almost negligible volume.

The Green Bay Metropolitan Sewerage District was created after petitions had been circulated under Chapter 66.20, Wisconsin Statutes of 1933. This Statute stipulates that, to organize a Metropolitan Sewerage District, a petition signed by five percent of the electors voting for Governor at the last general election, or being the owners of one-half the property in either acreage or assessed value within the limits of the territory proposed to be organized into such district, shall be filed with the Clerk of the County Court of the County having jurisdiction. Petitions were circulated under the direction of Meyer Cohen, then a councilman of Green Bay, who recognized the responsibility of the city and who had become intensely interested in cleaning up a condition which he recognized as disastrous if not corrected. A court hearing gave all parties interested an opportunity to review the reasons for and against the creation of a Metropolitan District. Expert testimony was introduced to show the condition of the rivers in the district and the effect river pollution has on property values and general sanitary conditions.

The State Board of Health, the Attorney General's Department and lawyers representing the various municipalities all took an active part in this hearing. The testimony introduced and the evidence presented to the court were favorable toward the formation of a district. The municipal judge recognized the need of a district and organized territory, including all of the present City of Green Bay, parts of the Town of Allouez and parts of the Town of Preb'e, into the Green Bay Metropolitan Sewerage District. He appointed three commissioners who have taken complete charge of the affairs of the sewerage district.

The Green Bay District was the first district organized under the new law which contemplated issuing municipal bonds to provide funds for construction. The constitu-



*The Building Housing the Treatment Plant Takes Shape. Plant Capacity 3 M.G.D.—Scheduled for Completion January 1st, 1935. Green Bay Metr. Sewerage Comm.*

tionality of the act had to be tested in court to assure the District of the legality and marketability of its bonds. The bonds of the district (4 per cent interest) have already been sold, and commanded a good premium.

A complaint filed by a land owner in the district enjoined the commissioners from spending public funds until authorized by the Court. The case was tried in a Circuit Court and the district won. It was appealed to the State Supreme Court, which affirmed the decision of the lower court and established the validity of Wisconsin's new sanitation law.—Chapter 66.20, Wisconsin Statutes 1933.

## Drafting of Plans and Specifications

The engineers entered into a formal agreement with the Commissioners to prepare plans and specifications for the construction of a system of intercepting sewers, pumping stations, pressure mains and a sewage disposal plant for the East River section of the Metropolitan Sewerage District. Careful surveys were made of the entire area and plans and specifications were prepared and presented to the Commission for approval. The estimated cost of construction in the East River District was given as $722,000.00. The engineer's plan, as pictured, involved the building of a system of intercepting sewers which would collect the sanitary sewerage or dry weather flow and conduct it to a treatment plant.

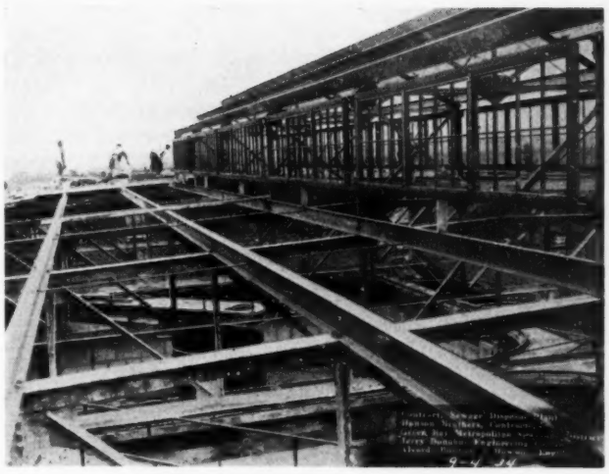
The old sewer system in Green Bay is of the combined type, parts of which are more than seventy years old. In more recent years the city has endeavored to separate the storm water from the sanitary sewage by the construction of trunk storm sewers to intercept surface drainage water and discharge it directly into the Fox River or East River. It was considered impractical to rebuild the entire sewer system of Green Bay upon a separate sewer basis as that would involve the construction of an entirely new system of sewers in the built up and improved section of the city at a cost of several million dollars. The plan approved by the Commission included the interception of the dry weather flow in a series of intercepting sewers, these sewers being equipped at twelve points in the East River District with control stations which permit discharge directly into the stream at times of heavy rainfall. During periods when the load on the interceptors has reached a dilution of five parts of rain water to one part of sewage, by-passing will take place.

About the time that plans were ready for the consideration of the Commission, the 73rd Congress passed the National Industrial Recovery Act, establishing the Public Works Administration, and the Commissioners of Green Bay decided to make an application to the Federal Government for a loan and grant. This application was approved by the Federal (P. W. A.) State Engineer and subsequently by Washington, and the work is now being done as P. W. A. Project No. 731.

## 1931 Estimates Close to Contract Cost Under P.W.A.

Since starting the construction work and awarding the contracts, much of the original opposition to such a large expenditure of public funds has subsided and the public feels that the benefits accruing to the community are more than sufficient to offset the possible increase in taxes. The Federal regulations included in the contracts required some readjusting of the estimates, but the actual bids received under P. W. A. were within $200.00 of the estimated cost of the project as made in 1931. The actual grant to the district by the Federal Government will amount to $216,900.00.

Since the approval of the original application by the P. W. A. an additional request has been made and approved for an appropriation of $133,000.00 additional to provide for a large 66-inch tunnel, in place of the pressure line originally designed to carry the sewage from the City of Green Bay to the disposal plant site. The actual appropriation set up for the contracts now under way is approximately $850,000. Of this, $530,000 will be expended for the intercepting sewer system; $240,000 for sewage disposal plant and land; $45,000 for storm flow control stations; $35,000 for incidentals and engineering.



*Roof Superstructure of Building Which Will House the Treatment Plant—Below Are the Clarifiers.*

## Value of Proper Study on Sewerage Projects Demonstrated

The work in the Green Bay Metropolitan Sewerage District has demonstrated the value of making a careful study and analysis of all conditions which have a bearing upon the formation of permanent policies and the determination of the most economical methods of building a system of collecting sewers, and the most practical method of sewage treatment to best satisfy immediate and future conditions.

This district has always experienced more or less trouble in the construction of sewers. The entire area was found, upon examination, to be underlain with a heavy red clay. This strata being impervious, creates adverse construction conditions for the first twenty feet of sewer depth. The engineers, therefore, concluded to go into tunnel construction wherever possible. As the tunnel operations are carried out in the clay formation, the conditions were ideal and no trouble has been encountered in connection with the building of the tunnels shown in accompanying illustration. Considerable difficulty has been encountered, however, in open-cut work where wet sand and poor soil conditions have caused the contractors trouble. The conditions in the tunnels bore out the analysis made by taking dry borings, and the contractor encountered no trouble in building the tunnels as specified.

The sewage treatment plant is of the separate sludge type, with gas collection and heating coils in the digester. The entire plant is being housed in, as pictured herewith, and should be ready to start operation by January 1, 1935. When the Fox River District develops, an addition to the plant will be necessary, at which time the Commission anticipates utilizing the surplus gas for production of power.

The Commission has been repeatedly criticized by skeptics and others who professed fear that the plan

would not work. Many propositions were offered as being better schemes for cleaning up the river, but none of the other plans proposed met with the approval of the engineers and were rejected.

The Commission adhered to its initial determination to have this system built as specified. They expressed confidence in the engineers and the solutions they recommended. The Commission now feels that the problem will be successfully solved and is already setting up a basic record showing what the present sanitary situation is. These records will serve later to compare with subsequent analyses of the waters in the river, to show the benefits derived from the new system which will take from the river practically one hundred per cent of the domestic pollution now entering it.

The Green Bay Metropolitan Sewerage District has paved the way in the State of Wisconsin and demonstrated to other communities how they might proceed to solve their sanitary problems which are complex and perplexing. The three commissioners appointed by the court are high class men who have been willing to serve their community with a determined purpose. The Commission is free of political entanglements, and if these men had to go through a political election, we question whether they would be interested in serving the district in the capacity in which they have rendered such splendid and unselfish service. They are interested in high class workmanship, honest dealings, and have the satisfaction of achieving a much needed improvement at a minimum of cost. The Commission meets periodically every week during the construction season. An afternoon conference is held with the engineers and their division staff, at which time all problems concerning policies are brought before the Commission, discussed, and the decisions recorded.

The Federal Department has two inspectors who have adjoining offices to the engineers. They report infringements and violations of the Industrial Recovery Act and in some cases, through carelessness or oversight, minor infractions have been reported but none of a serious nature. The engineers have enjoyed the confidence of the Commission and the public and the work has proceeded upon a schedule which will assure its completion within the time fixed by contract. Over two hundred Green Bay men have been continuously employed and the weekly labor payroll of nearly $10,000.00 has been felt by the merchants and business houses of Green Bay.

The completion of this project will add a new achievement to the records of the city which three hundred years ago received the first white man to come into the territory that later became Wisconsin—for just this year Green Bay celebrated her three hundredth anniversary of the coming of Nicolet.

The Commission of the Green Bay Metropolitan Sewerage District consists of James H. McGinnis as President, and Joseph H. Servotte as Secretary, with Ernst A. Neufeld serving as the third member. Meyer M. Cohen, who so ably promoted the project as Councilman, was retained by the Commission to act as its attorney. He served the Commission during 1932 and 1933 and since his removal from the District the firm of McGillan and Alk have been retained as the Commission's attorneys. Mr. John Tease, Treasurer of the City of Green Bay, is also Treasurer of the District.

The Jerry Donohue Engineering Company has been in active charge of all construction work and have supervised the work which is now about ninety per cent completed. B. J. Hartman and George Martin of the Jerry Donohue Engineering Company have had charge of the work—the latter serving as Resident Engineer under the direction of Mr. Hartman. The engineering staff consists of eight engineers and inspectors working under the direction of the Resident Engineer.

Alvord, Burdick and Howson of Chicago have been serving as consultants for the project.

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## Association Meetings Scheduled

Nov. 8-10—**Missouri Valley Section, A. W. W. A.** Hotel Fontenelle, Omaha, Neb. Secretary, Professor E. L. Waterman, University of Iowa, Iowa City, Ia.

Nov. 12-14—**North Carolina Section, A. W. W. A. and North Carolina Sewage Works Association.** Hotel Virginia Dare, Elizabeth City, N. C. Acting-Secretary-Treasurer, M. F. Trice, State Department of Health, Raleigh, N. C.

Nov. 15—**New England Water Works Association.** Hotel Statler, Boston Mass. Secretary, Frank J. Gifford, 613 Statler Building, Boston, Mass.

Dec. 27—**New York Section, A. W. W. A.** Hotel New Yorker, New York City. Secretary, R. K. Blanchard, Neptune Meter Company, 50 West 50th Street, New York City.

Jan. 3-5, 1935—**Texas Section, Southwest Water Works Association.** Hotel Driskill, Austin, Texas.

Jan. 15, 1935—**N. Y. State Sewage Works Association.** Hotel McAlpin, New York City. Secretary, A. S. Bedell, State Dept. Health, Albany, N. Y.

Jan. 16-18, 1935—**American Society Civil Engineers.** New York City. Secretary, Geo. T. Seabury, 33 West 39th Street, New York City.

Mar. 27-29, 1935—**Canadian Section, A. W. W. A.** Hotel London, London, Ont., Canada. Secretary, A. E. Berry, Ontario Department of Health, Parliament Buildings, Toronto, Ont., Canada.

May 6-10, 1935—**Annual Convention American Water Works Association.** Hotel Netherland Plaza, Cincinnati, O. Secretary, B. C. Little, 29 West 39th Street, New York City.

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## J. S. Whitener

J. Summie Whitener, head of the Department of Sanitary Engineering at North Carolina State College, died very suddenly at his home in Raleigh, N. C., on October 11th.

His death was caused by angina pectoris and he had but recently passed his 32nd birthday. His age attests the abilities of such a comparatively young man who was chosen to occupy the chair at the head of his department some four years ago.

"Summie" Whitener was one of the best known and most popular of North Carolina State College's alumni, having been graduated there in 1923 to take a position as Assistant Engineer with the North Carolina State Department of Health, which he served well for several years.

Later he became Superintendent of the Raleigh Filtration Plant and there perfected methods of improving plant operation and efficiencies which attracted considerable attention. It was from this position that he stepped into that of heading the newly created Department of Sanitary Engineering at State College, which was established in 1930 and developed by himself to become widely recognized.

For several years "Summie" Whitener had served as Secretary of the North Carolina Society of Engineers, and at the time of his death was President of the Engineer's Club of Raleigh. He had also previously held important offices in other associations and took an active part in their advancement.

Professor Whitener was a native of Hickory, N. C., and is survived by his widow and his mother. For his professional ability and many other capabilities he will be long remembered by his many friends and students who came to admire him for his genial personality and professional acumen.

# A NEW DEVELOPMENT IN SEWER CONSTRUCTION

By A. M. RAWN, C. E.*

*The Author*

IN 1925, the Los Angeles County Sanitation District's engineering offices, in connection with the design and construction of the works of the Districts in Los Angeles County, California, concluded that little, if any, of the vitrified clay pipe and unreinforced concrete pipe manufactured to meet the strength requirements of A. S. T. M. C-13 and 14-24 could be used in the construction of the Districts' lines unless reinforced by bedding or cradling in concrete. Such a conclusion was based on the fact that nearly all of the Districts' sewers would be placed more than ten feet underground, thereby imposing a load on the pipe greater than its supporting strength.

At that time it was suggested to the pipe companies that they produce a pipe which, unsupported by a concrete cradle, would meet the commonly encountered requirements of construction. And, it was pointed out to them that if they did so, it would be practical and economically sound to pay a higher price for their product, which would at least cover the additional cost of labor and material in its manufacture, plus a profit, and still save the buyer an impressive amount of money by reducing the cost of construction of sewers.

Due, no doubt, to the fact that the manufacturers felt that any change in design, particularly in pipe thickness and strength, would necessitate a substantial change in manufacturing equipment and other process changes, with resultant capital expenditures in the plant, pipe continued to be manufactured to meet the requirements of A. S. T. M. C-13 and 14-24, necessitating the imbedding of many miles of sewer lines in concrete cradles, at great expense to the owners and also an appreciable loss in profits to the manufacturers.

Some relief was obtained with the advent of centrifugally spun concrete pipe, because it was a simple matter to increase its shell thickness by using for a pipe form the mold of the next larger diameter pipe; but it was not until 1931 that one of the clay pipe manufacturers successfully constructed an unglazed vitrified clay pipe of a shell thickness and unit strength of material to withstand, unsupported, the trench load imposed when placed as deep as 20 feet underground.

Following this demonstration of strength and the manufacturer's assurance that such pipe was a commercial possibility, representatives of the engineering departments of the City of Los Angeles, Los Angeles County and the Los Angeles County Sanitation Districts met with representatives of the pipe manufacturers of Los Angeles County and jointly prepared specifications describing two classes of unreinforced pipe which the manufacturers agreed to furnish, viz., standard strength and extra strength. Standard strength pipe may be laid unsupported in trenches ten feet and less in depth, while extra strength pipe will stand the load equivalent of twenty feet of back fill, less the pipe diameter. Both have a safety factor of 1.5 to 1 at maximum prescribed loading. Table I indicates the general dimensions and strength requirements of each class and character of pipe.

In order that trench loadings may be controlled, the specifications adopted contain a clause to the effect that the maximum allowable trench width at the pipe crown shall not exceed the outside diameter of the pipe plus 16 inches, where the pipe is placed at maximum allowable depth. The load on the pipe in the trench varies, within limits, with the trench width at the pipe crown and as the trench depth; therefore, the maximum trench width may be increased as the trench depth decreases. Table II indicates the maximum allowable trench width at various depths for standard and extra strength pipe.

*Assistant Chief Engineer, Los Angeles County Sanitation Districts, Los Angeles, Calif.

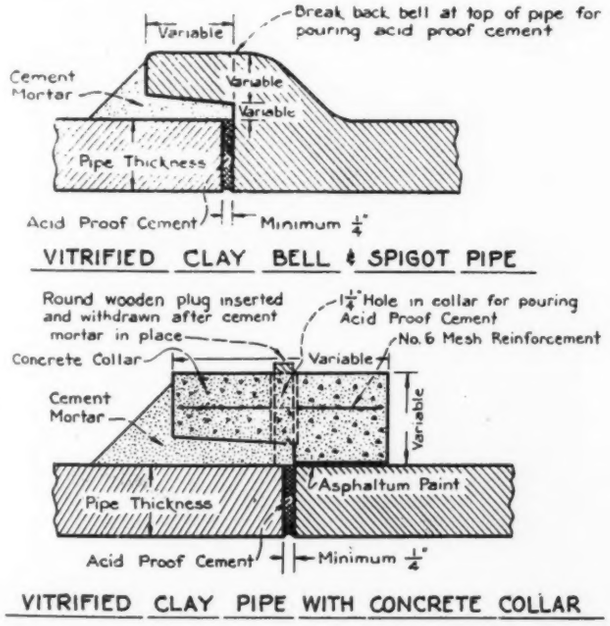



*Fig. 1.—Standard Acid Proof Joint for Vitrified Clay B. & S. Pipe*

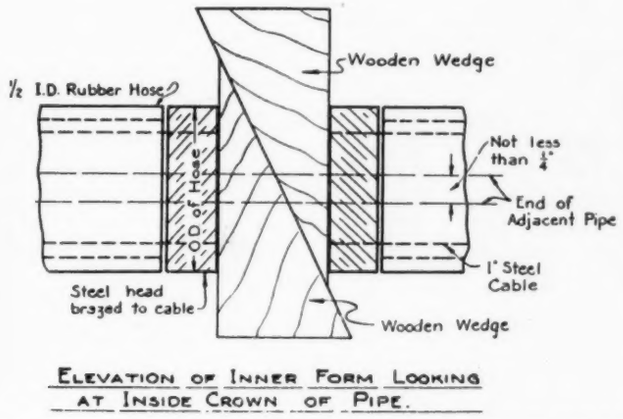

1/2 I.D. Rubber Hose
Wooden Wedge
Head to O.D.
Not less than 1/4"
End of Adjacent Pipe
1" Steel Cable
Steel head brazed to cable
Wooden Wedge
ELEVATION OF INNER FORM LOOKING AT INSIDE CROWN OF PIPE.

*Fig. 2.—Inner Form Used in Pouring Acid Proof Cement Joints. Showing Detail of Abutting Ends of Hose Covered Steel Cable When in Place. The Wedges Are On the Inside and at the Crown of the Pipe*

TABLE I—STRENGTH REQUIREMENTS AND MINIMUM REQUIRED WALL THICKNESS OF UNREINFORCED PIPE

| | Standard Strength Pipe | | | Extra Strength Pipe | | |
|---|---|---|---|---|---|---|
| Sizes— | Shell Thickness Concrete Pipe | Shell Thickness V. C. Pipe | Minimum Test Loads Lbs. per Lin. Ft.* | Shell Thickness Concrete Pipe | Shell Thickness V. C. Pipe | Minimum Test Loads Lbs. per Lin. Ft.* |
| 6 | ¾″ | 13/16″ | 1620 | ¾″ | 13/16″ | 2020 |
| 8 | ⅞″ | ⅞″ | 1850 | ⅞″ | ⅞″ | 2450 |
| 10 | 1″ | 1″ | 2060 | 1″ | 1″ | 2930 |
| 12 | 1⅛″ | 1⅛″ | 2280 | 1½″ | 1⅛″ | 3350 |
| 15 | 1⅜″ | 1⅜″ | 2630 | 1⅞″ | 1½″ | 3990 |
| 18 | 1 9/16″ | 1½″ | 2930 | 2⅛″ | 2″ | 4680 |
| 21 | 1⅞″ | 1⅞″ | 3210 | 2¾″ | 2 3/16″ | 5400 |
| 24 | ... | 2″ | 3500 | ... | 2½″ | 5880 |
| 27 | ... | 2¼″ | 3750 | ... | 2¾″ | 6540 |
| 30 | ... | 2½″ | 3990 | ... | 2⅞″ | 7140 |
| 33 | ... | 2⅝″ | 4190 | ... | 3⅛″ | 7790 |
| 36 | ... | 2¾″ | 4400 | ... | 3¼″ | 8400 |

*Sand bearing loading test.

TABLE II—TABLE OF MAXIMUM ALLOWABLE TRENCH WIDTHS AT INDICATED TRENCH DEPTHS

| | Standard Strength Pipe | | Extra Strength Pipe | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Trench Depth—Pipe Invert to Top-Fill | | Trench Depth—Pipe Invert to Top Fill | | | | | |
| Pipe Diameter | 8 to 10 Ft. | Less than 8 Ft. | 18 to 20 Ft. | 16 to 18 Ft. | 14 to 16 Ft. | 12 to 14 Ft. | 10 to 12 Ft. | Less than 10 Ft. |
| 6 | 2′-0″ | No limit | 2′-0″ | 2′-0″ | 2′-0″ | 2′-1″ | 2′-2″ | No limit |
| 8 | 2′-2″ | " | 2′-2″ | 2′-3″ | 2′-3″ | 2′-4″ | 2′-5″ | " |
| 10 | 2′-4″ | " | 2′-5″ | 2′-6″ | 2′-6″ | 2′-8″ | 2′-9″ | " |
| 12 | 2′-6″ | " | 2′-8″ | 2′-8″ | 2′-9″ | 2′-11″ | 3′-1″ | " |
| 15 | 2′-10″ | " | 2′-11″ | 3′-0″ | 3′-1″ | 3′-3″ | 3′-6″ | " |
| 18 | 3′-1″ | " | 3′-3″ | 3′-4″ | 3′-6″ | 3′-8″ | 4′-0″ | " |
| 21 | 3′-5″ | " | 3′-7″ | 3′-8″ | 3′-10″ | 4′-1″ | 4′-6″ | " |
| 24 | 3′-8″ | " | 3′-9″ | 3′-11″ | 4′-1″ | 4′-5″ | 4′-10″ | " |
| 27 | 4′-0″ | " | 4′-1″ | 4′-3″ | 4′-6″ | 4′-10″ | 5′-4″ | " |
| 30 | 4′-3″ | " | 4′-4″ | 4′-6″ | 4′-10″ | 5′-3″ | 5′-10″ | " |
| 33 | 4′-6″ | " | 4′-7″ | 4′-10″ | 5′-2″ | 5′-8″ | 6′-5″ | " |
| 36 | 4′-10″ | " | 4′-11″ | 5′-2″ | 5′-6″ | 6′-1″ | 6′-11″ | " |

Since adoption in 1931 of the new specifications these have become standard throughout the Southern California area and are now used in all sanitary sewer and storm drain design where applicable. An impressive number of sewers and drains have been constructed of the high strength pipe without any known failures by crushing. Recently the Los Angeles Sanitation District completed a trunk sanitary sewer in which it profited by the beneficial features of the extra supporting strength of the new pipe. In addition, there was introduced a modification in pipe design, thought to be unique in sanitary sewer construction, which possesses distinctive advantages.

## Use of New Pipe in Trunk Sewer Project

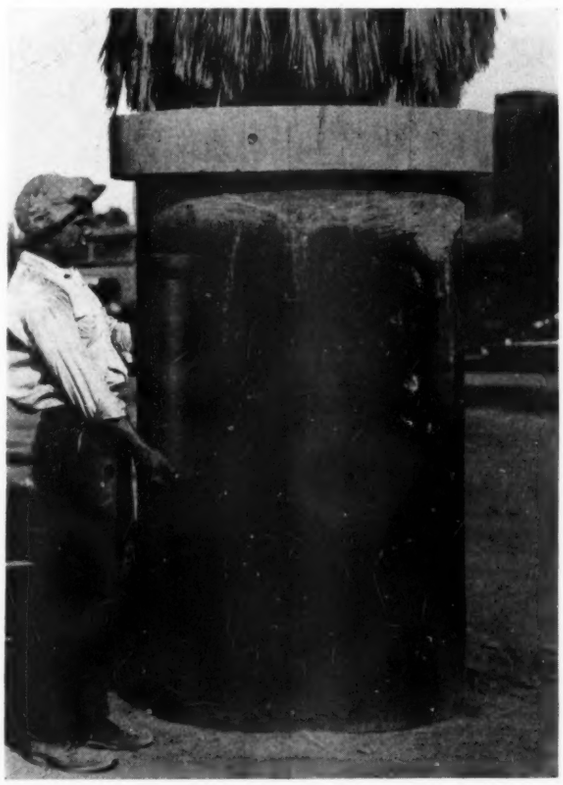
The Hooper Avenue-Compton Creek Trunk Sewer is 4½ miles in length. In diameter of pipe, it varies from 36 to 27 inches, and its grade line lies twelve to eighteen feet below ground surface. The ground through which it is built varies from water-bearing sand to dry adobe, and for a large part of its length it parallels an open drainage ditch which it crosses at two points.

Pipe for the job was specified as extra strength, unglazed vitrified clay and was furnished by two local companies in three, four and six-foot lengths. The three and four-foot pipe are of the regular bell and spigot type but the six-foot pipe, for reasons which appear later, were manufactured as plain end pipe, which were subsequently equipped with reinforced concrete collars to form the bells.

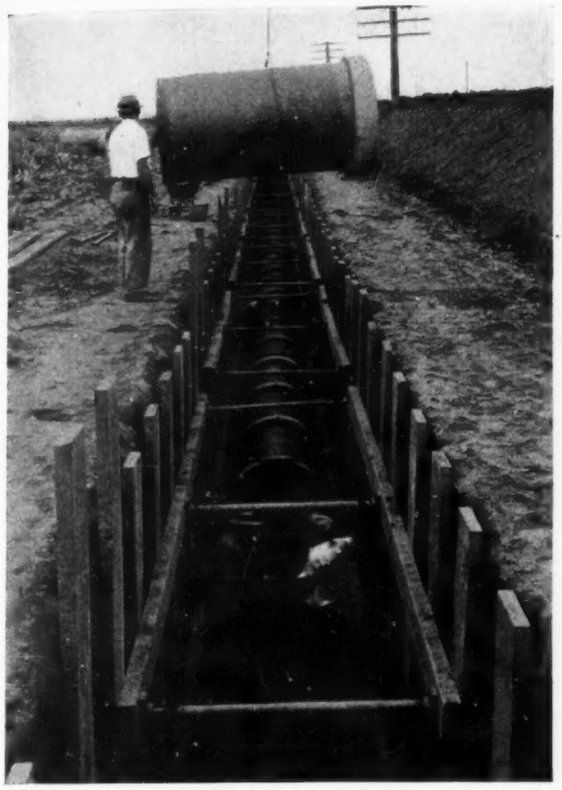
From the standpoint of construction of the line, the Los Angeles County Districts prefer the six-foot lengths of large diameter pipe because of the appreciable reduction in number of joints to construct in the field, less pipe to handle into the trench; and, because the very bulk of the pipe itself renders it easier to set and hold rigidly in place during laying. Joint manufacture is identical with either the regular bell and spigot type or the clay-barrel concrete-bell pipe.

## Construction Advantages

As may be noted in Figure 1, the annular space between the concrete bell and clay spigot is first packed in the usual manner with stiff cement mortar. As soon as the cement mortar has set (preferably the day following its



*A 6 Ft. Length of the 36 In. Extra Strength Unglazed Vitrified Pipe, Equipped with Reinforced Concrete Bell Collar. Man Is Holding a 4 In. Pipe*



*Method of Slinging and Lowering the 6 Ft. Lengths of Pipe. Man 5 Joints Back Is Stuffing Cement Mortar Into a Bell*

placement), an inner-circumferential form is expanded and held in place spanning the inside joint between pipe ends. The inner form is a 1-inch steel cable encased in a 1½ inch rubber hose, and the cable ends are brazed to 1½ inch diameter steel heads. After the form has been sprung into place it is tightened by driving wooden wedges between the cable ends as shown in Figure 2. The space between the pipe ends is then poured full of an acid-resisting compound which, in the pipe line under discussion, was a clay-sulphur-silica mixture manufactured under the trade name of "C. P. I."* This material is melted by heating to about 250° F., at which temperature it remains fluid long enough to flow into and completely fill the space between pipe ends (the joint) before crystallizing. The inner joint form may be removed about five minutes after pouring, therefore three or four of these forms are all that have been required. A number of different types of joint forms have been tried, but the stiffened rubber hose (Fig. 1) has proven the most successful.

The resulting joint exposed on the inside of the pipe is one which is not affected by the presence of any of the gases or acids commonly encountered in lines carrying sanitary sewage and industrial wastes, no matter how septic or how acidic or what the sulphate content may be. No concrete or mortar is exposed on the interior of the pipe and the sulphur compound seals the joint perfectly. It is felt that this type of construction may be used with safety under practically all conditions of sewage flow.

At the outset of the project, which has been completed, the cost per joint for 36-inch pipe joint manufacture alone, including all labor and materials, was $2.70. A test run toward the end of the job indicated, however, that this cost had been reduced to $2.11 per joint. The cost per joint for similar construction on 33-inch pipe, as the job neared completion, was $1.41, but since certain further economies have been effected, it is disclosed that upon a similar job using similar pipe, the cost for 33-inch joint manufacture has been reduced to $1.14 per joint.

The cost of the extra strength, six-foot pipe of 36-inch diameter is about $1.00 more per foot than the ordinary type of glazed 36-inch clay pipe manufactured in accordance with A. S. T. M. specifications. The cost of a concrete cradle which might be used to support A. S. T. M. pipe of lower strength, required to render it as safe in place as is the extra-strength pipe, is in excess of $2.00 per foot. Joint manufacture for either type is identical and the possible savings is therefore apparent. Smaller sizes of pipe show smaller cost differentials, but for each there is a definite saving in cost to the owner, and without sacrifice of security.

## Fabrication and Characteristics of the Pipe

From the manufacturers' angle, the construction of a vitrified clay sewer pipe six feet in length, which must have a supporting strength far in excess of that commonly encountered, presented a number of unusual and unique problems. The clay used in the new high strength pipe comes from a number of different sources, and because it is deposited in rather thin and irregular strata has had to be mined by hand. It is then blended, ground and moistened and, at least at one plant, extruded under vacuum. The latter feature increases its strength, lowers moisture absorption by the burned product and produces a resistant pipe with smooth and uniform surface.

The six-foot lengths of 36-inch pipe weigh about 2,400 pounds each (without bell), and ordinary equipment for turning pipe of such weight and size in the drying sheds is unsuitable. A number of changes have been made at this point in the production process. The pipe are fired to about 2200° F. in ordinary down-draft beehive kilns. Salt-glazing is not employed because the glazing is not required to increase the pipe's imperviousness and because flow tests have indicated that friction coefficients are actually higher with salt-glazed pipe than with this smooth but unglazed product. About 45 days are consumed in pipe manufacture, one-half of which is devoted to extruding and drying the clay and the other half to firing and cooling.

Bells of concrete are being used on the six-foot lengths for two reasons: In the first place, more of the six-foot pipe can be loaded into a kiln if there are no bells cast thereon. Secondly, the actual cost of fabricating and applying the concrete bell, following the pipe manufacture, is less than the over-all cost of casting the clay bell integrally with the pipe if all the costs of labor and materials entering into the product are considered. By carefully proportioning the component parts of concrete in the bell ring and by strict observance of certain elements during its curing it has been found that the collar may be poured in place on the pipe and attain its strength without cracking. Painting the end of the pipe upon which the bell is to be cast with asphaltum compound has proved an added safeguard.

The saving in kiln space by elimination of bells is more than offset by the increase in the required number of concrete bells if the pipe is cast in three or four-foot lengths; therefore, the shorter lengths of the improved pipe are cast as regulation bell and spigot type only. In this area the use of the concrete bell is therefore limited to six-foot pipe, for reasons of manufacturing economy.

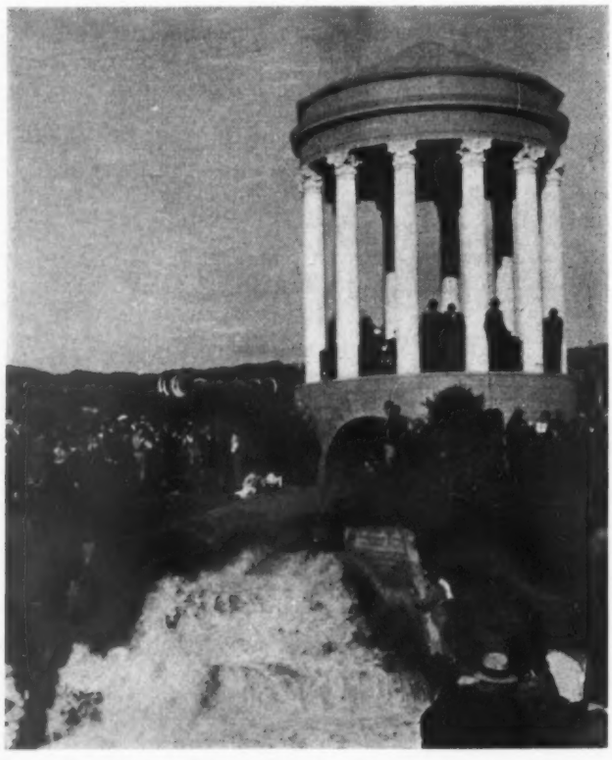
[*The compound is a production of the Clay Products Institute, hence its trade name "C. P. I."—Ed.]

# SAN FRANCISCO GETS ITS FIRST DRINK OF HETCH HETCHY WATER

ON October 28, 1934, San Francisco began to use the waters of the Tuolumne, impounded behind the O'Shaughnessy Dam in sufficient volume to supply the city for 3½ years with a water of extreme purity.

Through the longest tunnel ever built by man (25 miles) and other shorter ones and pipe lines, for a total of 155 miles, from the Hetch Hetchy* Valley in Yosemite National Park, travels the melted snows of the High Sierras to attest the successful completion of one of the world's most important engineering projects.

Recommended by the City Engineer in 1901, the question of the legality of the use of waters from a National Park area delayed matters until President Woodrow Wilson signed an Act of Congress (1913) granting San Francisco full rights to the taking of the water. The year previous (1912) the late John R. Freeman had offered an improved plan of developing the Hetch Hetchy System which was followed out, essentially as he had proposed, by the new City Engineer, M. M. O'Shaughnessy, who devoted 22 years to the project, 20 years under construction, and unfortunately died October 12th within a few days of the actual turning in of the water.



*From Beneath the Water Temple Gushes the First Water to Reach San Francisco from the Hetch Hetchy. Secretary Ickes and Mayor Rossi Are in the Left Foreground.*

*The O'Shaughnessy Dam with Its 67 Billion Gallon Storage of Melted Snow.*

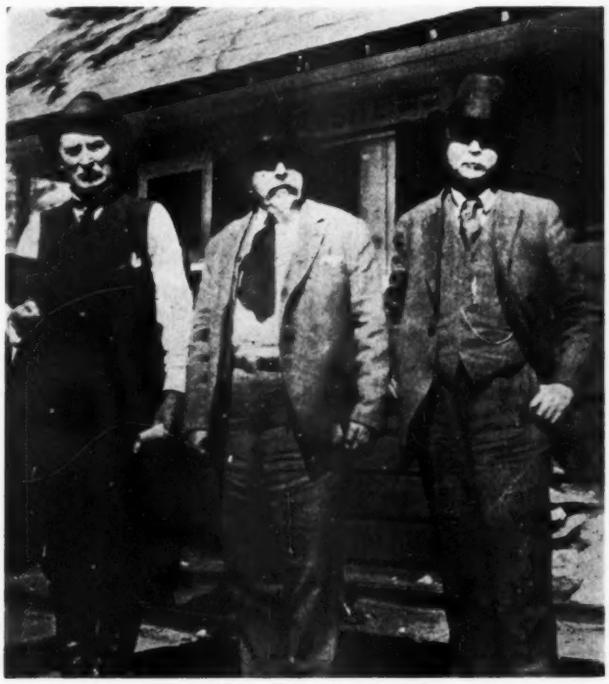
N. A. Eckart is General Manager and Chief Engineer; Thos. W. Espy is Production Engineer; and George Pracy is Superintendent of the San Francisco Water Department.

[*The meaning of the Indian name "Hetch-Hetchy" is not definitely known.—Ed.]

▼

## H. B. Rice Appointed City Manager

Hugh B. Rice, former Superintendent of Water Works and lately City Collector of Staunton, Va., has been appointed Manager of Utilities and Public Works at Lexington, Va. Without the official designation, Mr. Rice in reality becomes City Manager of Lexington, Va., representing a markedly rapid advancement for the young engineer who entered the City Water Department of Staunton in 1928 as an assistant engineer. We congratulate you, Mr. Rice!



*M. M. O'Shaughnessy, John R. Freeman and C. E. Grunsky at the Damsite on the Hetch Hetchy Project.*

# EDITORIALS

## Advertising the Water Utility

IT is no longer sufficient to say, "Its Pays to Advertise." It is necessary to say, "It Pays to Advertise Correctly," and nowhere is this more truthful than when applied to Public Service Utilities, including the water utility. In this case the term "advertising" is applied in its broadest sense, which is a process of getting the attention of the public through various channels. In this broad sense there are two classes of "advertising"—good and bad.

On this point Mr. Eisert in his article on "Advertising the Water Utility," which appears elsewhere in this issue, dwells at some length. He makes it plain that almost every action of the personnel of the local utility, whether it be a Water Company or a municipal Water Department, is in one way or another advertising the organization he represents or serves. Likewise, the condition and appearance of every bit of property and equipment which comes before the eyes of the public is in effect "advertising copy" which is obliged to make impressions that constitute good or bad advertising, as the case may be.

The chief objective in advertising the Water Utility, as in the case of other utilities, is that of securing friends, the friendliness resulting being commonly called "good-will." This same good-will is one of the most valued assets of any going business or successful distributing corporation. Why then should it not be valued equally by the public utility as by the private utility? The monopolistic or governmental nature of the business of water supply has deprived "good-will" in this field of its highest significance, but in recent years keen sighted water company officials have come to realize its true value; and the same reaction is becoming more in evidence in the municipally operated utility. As a matter of fact, selling "service" has become a highly important factor in selling equipment and everywhere one sees greater emphasis being placed on the future servicing of equipment sold than on the equipment itself. One buys a GX electric refrigerator, for instance, in preference to an AA machine because of the reputation which the GX Company has for service. "Service" then will probably be the key-word to future success of any organization or corporation dealing with or selling directly or semi-directly to the public.

While water companies have come to realize the full value of advertising to secure "good-will," Water Departments have been less appreciative of the possibilities in this direction. That is not true of Park and Playground Departments which flourish on "good-will." It should be the aim of every Water Department employe to have *his* Department the most appreciated of any serving the municipality—certainly it is the most essential. Water has become too commonplace—too much taken for granted. Policemen and firemen look forward to retirement pensions while the faithful water-works employee just becomes a "forgotten man." What Water Departments need is a nice shiny fire engine or a hook and ladder to run through the streets. The question is how to get its equivalent.

Mr. Eisert suggests several means, among them being the improved appearance of the Water Department's repair and maintenance trucks and a careful grooming of its employees who come in contact with or reach the public's eye; a dressing up of the water-works properties in general. Such little things as a fresh coat of aluminum paint on meters returned after test or repairs, or the white-washing of tree trunks and fresh paint around the plant have a lasting and cumulative effect. The psychological effect is that the water is obliged to taste better—to become less commonplace.

A suggestion by C. M. McCord, General Superintendent of the Water Department of Memphis, Tenn., which he made before the Southwest Water Works Association, deserves consideration. Briefly, he proposes to equip shiny trucks to run about the city making meter tests in the field before the consumers' eyes. He believes that such tests made at a nominal cost, and as promptly as possible after a check-up test is offered and accepted, will in time result in the reduction of complaints to an irreducible minimum, advertise the Water Department, and increase good-will. Certainly such a scheme would be novel and impressive even though the test charge collected fails to make the service self supporting. The unique service effectively advertised will in turn advertise the Water Utility. A spic and span truck painted green and white may yet serve as a next best thing to a red and gold fire truck.

The question of paid advertising in local papers is a matter for consideration, but unpaid advertising which can be procured by "selling" the editor on what the Water Department is worth to the community and, too, the playing up of the romance of water supply, will be worth far more. Propaganda of the right sort has a place in every enterprise and it should be utilized by Water Departments. Pumping Stations and Filtration Plants cannot be paraded through the streets but they can be beautified and dressed up with the aim of bringing the Sunday and holiday drivers out to learn of the utilitarian and the romantic side of the never sleeping water-supply business. It is well on such days to have on hand the Department's best "salesman" to meet the grouped visitors at scheduled intervals to portray "system." Then let the City Editor tell you how to get the public so curious that it will drive out to the plants. The manager who brings the greatest number of prospects to his salesmen is usually a highly successful official.

If you don't believe that "Advertising Pays," try it out. It will likely bring about a reduction in the required personnel in the Complaint Division and secure boosters for the Department and its management. Then, "City Hall" will sit up and take notice!

Harry E. Jordan

# NEW EQUIPMENT AND LITERATURE

## Novel Mechanical Aerator

The Lakeside Engineering Company are offering a novel mechanical aerator for sewage treatment by the activated sludge process.

The Chicago Aerator mechanism for hexagonal tanks, is equipped with a motor operated propeller which lifts bottom liquor up a central draft tube and discharges it against a freely rotating (inverted) cone which breaks the liquid stream into froth of sewage and air. The liquid then drops to a stationary splash plate, located above the water level, which has spiral shaped vanes or baffles. A series of hydraulic jumps are created by cross veins, thus giving a secondary aerating turbulence. A third aeration takes place as the liquid drops to the water surface in the tank. The liquid leaving the baffle splash-plate (platform) tangentially, causes the entire tank contents to take on a spiral flow movement (peripheral speed 1.5 ft. / sec.)—thus insuring effective mixing and displacement. The two speed impeller motor, operating at low speed, will turn over the contents of the aerating tank every 20 minutes. The entire mechanism is suspended from the top of the tank.

The power consumption, reported by the manufacturers, is roughly 19 h.p. per million of sewage treated at high speed motor operation and about 10 h.p. at low speed—a combination of the two (series unit operation) giving a requirement of 15 h.p. or slightly less per million.

The Chicago Aerator, amply illustrated and described and accompanied by operating data, is covered in a bulletin bearing that title. For a copy: Address, Lakeside Engineering Company, 176 West Adams Street, Chicago, Illinois.

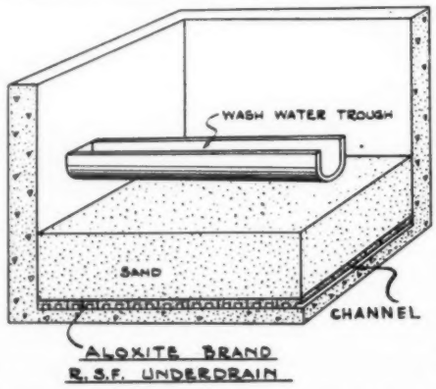
*Chicago Aerator*

## Something New in Filter Bottoms

The most interesting development in rapid sand filter underdrain schemes since the Harrisburg type was developed, has been recently announced (WATER WORKS AND SEWERAGE for October) by the Carborundum Co. of Niagara Falls, N. Y.

Having been successful with their "Aloxite" air diffuser plates and tubes, employed in sewage and water-aeration, this company has experimented with and perfected an "Aloxite" plate of special porosity, which is offered as an underdrain plate for constructing bottoms for rapid sand filters and zeolite units. These plates are composed of fused, crystalline oxide of alumina.

The channels molded into the plate serve as laterals for air or water wash of the filter bed. The porous plate itself is the distributor—thus eliminating the necessity of the gravel bed and special air distribution piping within the filter. The advantages are immediately apparent: No gravel bed to become inverted and clogged; less depth of filter box required; no danger of bed "blow-ups" by water rush or trapped air; most effective uniformity of distribution of wash water and filtration ratios; no metal to corrode. The manufacturer guarantees permanence and less head loss due to friction than with previously accepted underdrain systems. With this new type of filter bottom it is possible to combine air and water wash where desirable.




*Filter Equipped with Aloxite Underdrain Plates*

"R.S.F." Aloxite plates are 11⅞ inches square and are bonded to the filter floor with high grade asphalt (phenol free) and the ⅛ inch joints between plates are made of the same material. The Carborundum Co. maintains a special Sanitary and Filtration Department which has just issued Engineering Bulletin No. 2 on "Aloxite R S.F." Underdrain Plates. For a copy, which gives detailed technical data, address Filtration Dept., Carborundum Co., Niagara Falls, N. Y.

## Walter Kelsey Returns to Lord and Burnham

Walter Kelsey, who for several years was connected with the Lord and Burnham Company, manufacturers of Glass Enclosures for Sewage Treatment works, has recently returned to this company. He is

now connected with the Sales Department—having charge of sales in the sanitation field and directing the Service Department, which renders assistance to engineers designing glass enclosures for various usages. His headquarters will be at the company's Irvington, N. Y., plant.

## C. A. Bushnell to Sell "Hydro-Tite"

Charles A. Bushnell has recently become associated with Hydraulic Development Corporation.

He is a former resident of Westbrook, Connecticut. For the past five years he has been employed as a detached agent for the Metropolitan Life Insurance Company of New York.

Mr. Bushnell, after a training period at the factory in Boston and Main Sales Office in New York, will sell "Hydro-Tite" for jointing water mains and "Sani-Tite," a sewer jointing compound, in New Jersey, Pennsylvania and Virginia.

He will make his home in New Jersey and work out of the main sales office of the company at 50 Church Street.

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# Intermediate treatment with Ferric Chloride

Sanitation engineers who have studied the intermediate chemical sewage treatment in actual operation in California, using Ferric Chloride as coagulant, have declared that for disposal in most places the treatment is entirely satisfactory. The process, developed by Great Western engineers, is far more effective than plain subsidence since it removes 85% to 95% of all suspended matter and 70% to 80% B. O. D. Compared to the activated sludge process it combines adequate treatment with economy and simplicity of operation: using two stages of sedimentation, a dosage of about 1 grain of ferric chloride per gallon applied to the second basin is usually sufficient.

Great Western engineers are available without charge for consultation on application of the process and on the design of sewage plants for intermediate treatment. Bear Brand Ferric Chloride can be supplied in solution form containing 40% to 50% anhydrous $FeCl_3$. We shall be glad to answer inquires concerning both the method and the product to be used.

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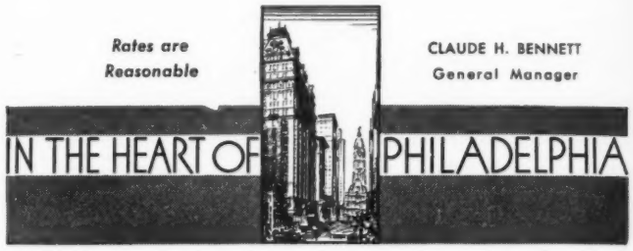


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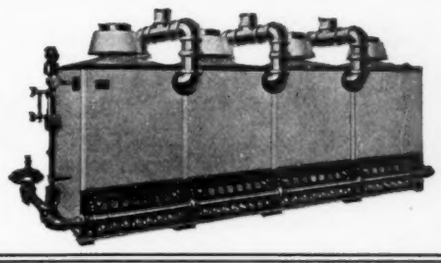

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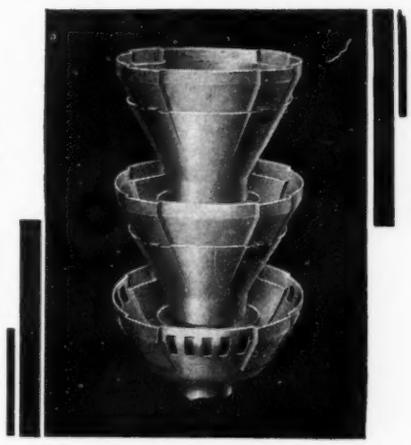

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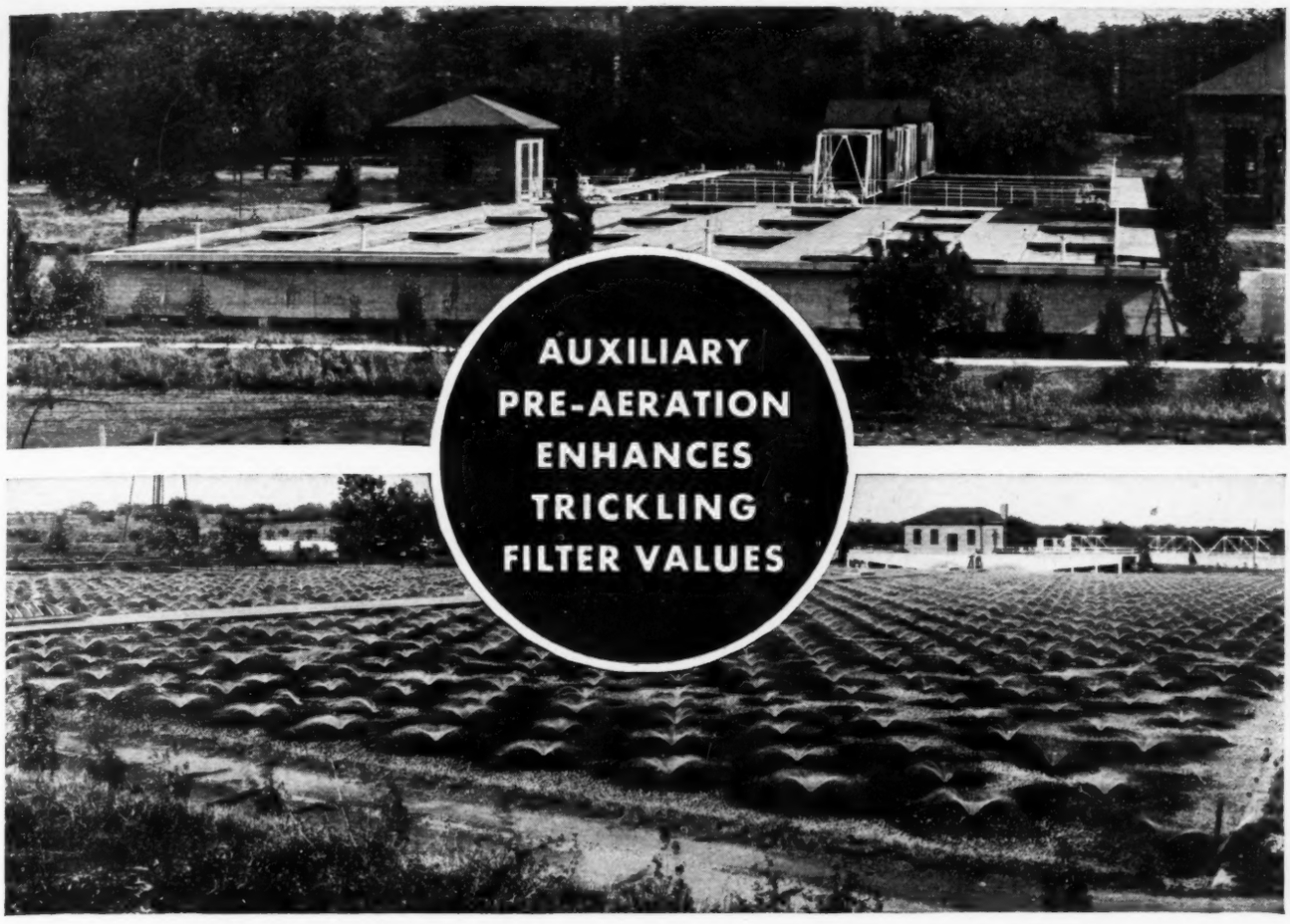


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